CONTENTS VOLUME III.

CONTENTS VOLUME IV.

CONTENTS VOLUME V.

SIXTH BIENNIAL REPORT

OF THE

STATE MINE INSPECTORS,

TO THE

GOVERNOR OF THE STATE OF IOWA

FOR THE

TWO YEARS ENDING JUNE 30, 1893.

JOHN VERNER, District No. 1; JOHN W. CANTY, District No. 2;
MORGAN G. THOMAS, District No. 3.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
G. H. RAGSDALE, STATE PRINTER.
1893.

BIENNIAL REPORT.

The Honorable HORACE BOIES, *Governor of Iowa:*

SIR—I have the honor to submit to you my report, covering the biennial period ending June 30, 1893, on the condition of the mines in the first inspection district of the State. In it will be found the tables and statements required to be compiled and published according to law, together with such other matters as I thought important enough to incorporate.

The mining industry in this district is in a healthy and prosperous condition. No disputes did arise between the miner and the operator and consequently no strikes or lockouts have occurred. Hard times, which made their blighting influence felt in many parts of this country, have left this great industry practically untouched. The outlook in the future is most bright. The indications are that over two million tons of coal will be produced in the district during the present year.

Since my appointment, May 23, 1892, I have visited all the mines employing more than ten men as often as possible and as occasion seemed to require. I am glad indeed that I am able to say, that, while some mines in this district have not been operated in full compliance with the law, most of them have shown marked signs of improvement during the last year. In no case have I been compelled to invoke the aid of the law to force the making of necessary improvements, although I must say that I have come very near doing so several times.

I believe the time is near at hand, when the mines in this district will compare favorably with any in the country so far as sanitary condition and safety are concerned.

Very respectfully,

JOHN VERNER,
Inspector District No. 1.

The first inspection district is at present composed of ten coal producing counties, namely: Davis, Wapello, Monroe, Appanoose, Wayne, Lucas, Warren, Adams, Taylor and Page. The output of coal in these counties during 1890 and 1891 was 2,440,957 tons and in 1892 and 1893 it reached 3,078,075 tons, an increase in the last two years of 637,118 tons. To secure this output 137 mines were operated, giving employment to 2,832 miners and 981 day men, whose combined earnings amounted to the handsome sum of $3,343,035. The counties showing the largest increase in tonnage are Monroe and Appanoose.

TABLE No. I

Showing number of mines, annual output, number of miners and other employes, value of product, etc., in District No. 1, for the year ending June 30, 1892.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	All other employes.	Average price per ton paid for mining.	Total amount paid miners.	Amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mine.	Capital invested.
Appanoose	51	324,400	1,307	309	$ .93	$ 451,515	$131,483	$1.23	$ 595,968	$ 424,400
Adams	13	13,940	62	12	1.04	19,500	1,837	1.68	27,601	6,250
Davis	3	2,005	12	2	.75	1,550	160	1.70	3,307	1,500
Lucas	4	7,495	23	5	.98	7,343	620	1.94	14,510	5,200
Monroe	15	521,785	593	342	.64	332,540	170,950	1.49	777,496	1,214,800
Page										
Taylor	6	14,930	62	19	1.17	17,450	6,765	2.15	31,096	8,200
Wapello	12	253,075	297	117	.78	197,780	55,070	1.40	334,306	223,500
Warren	9	9,570	32	5	1.15	10,925	1,270	2.14	20,479	4,600
Wayne	5	33,600	112	28	.98	32,800	10,550	1.48	49,723	62,000
Total	118	1,380,800	2,430	830	$ .93	$1,067,703	$367,705	$1.72	$1,874,392	$2,052,450

TABLE No. II.

Showing number of mines, annual output, number of miners and other employes, value of product, etc., in District No. 1, for the year ending June 30, 1893.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	All other employes.	Average price per ton paid for mining	Total amount paid miners.	Amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mine.	Capital invested.
Adams	17	18,925	91	25	$1.12	$ 21,190	$ 4,928	$2.44	$ 46,067	$ 7,400
Appanoose	70	631,875	1,723	512	.97	611,950	234,144	1.52	930,179	2,122,297
Davis	3	2,220	15	3	.93	2,060	250	1.59	3,529	4,300
Lucas	4	10,200	48	13	1.04	10,590	1,725	1.90	19,602	8,000
Monroe	16	641,805	737	370	.83	405,048	219,580	1.31	840,764	1,199,700
Page	1	1,450	10	1	1.69	2,450	180	2.50	2,675	3,000
Taylor	6	25,170	102	7	1.09	28,560	2,160	2.05	72,098	15,100
Wapello	16	279,160	306	140	.61	169,340	95,097	1.43	399,198	165,200
Wayne	9	71,535	148	44	.94	58,099	14,550	1.45	89,068	93,250
Warren	13	14,575	54	14	.91	13,390	3,220	1.95	28,421	11,700
Total	157	1,697,215	3,234	1,130	$ .99	$1,323,693	$573,934	$1.82	$2,432,931	$3,630,550

TABLE No. III.

Showing average number of mines in operation, output of coal, average number of miners and other employes, compensation of employes, value of product, etc., in District No. 1 for the biennial period ending June 30, 1893.

COUNTY.	Average number of mines in operation	Number of tons of coal produced.	Average number of miners employed.	Average number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mines.	Total value of product at mines.
Appanoose	60	1,156,275	1,405	400	$ .95	$ 1,053,775	$ 354,627	$ 1.37	$ 1,526,147
Adams	15	32,865	85	19	1.08	36,690	5,865	2.21	73,668
Davis	4	4,225	13	3	.84	3,610	410	1.64	6,726
Lucas	4	17,695	58	9	1.01	17,939	5,345	1.95	34,502
Monroe	15	1,163,500	663	356	.64	738,588	390,330	1.40	1,618,259
Page	1	1,450	10	1	1.69	2,450	180	2.58	3,675
Taylor	6	50,100	82	13	1.13	56,010	8,925	2.10	102,197
Wapello	14	532,235	303	128	.79	367,123	148,167	1.42	753,503
Warren	11	24,145	43	10	1.03	24,315	4,480	2.04	48,900
Wayne	7	95,435	130	36	.96	90,899	23,100	1.47	138,736
Total	137	3,078,075	2,832	981	$ 1.00	$ 2,401,396	$ 941,639	$ 1.81	$ 4,307,323

TABLE No. IV.

Coal output of the counties comprising District No. 1 for the past eight years.

COUNTY.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
Appanoose	180,000	160,350	210,263	246,634	388,729	293,255	524,400	631,875
Adams	9,581	19,851	18,817	13,566	14,280	14,872	13,940	18,925
Davis	1,000	1,800	1,800	1,640	3,200	2,272	2,005	2,220
Lucas	530,750	472,908	264,959	263,851	252,134	136,722	7,495	10,200
Monroe	117,700	183,565	223,896	224,742	309,402	336,477	521,785	641,805
Page	1,550	1,780	3,430	2,400	2,320	2,700		1,450
Taylor	8,586	12,189	8,092	12,731	8,120	13,420	14,930	25,170
Wapello	237,111	272,073	280,395	273,362	297,459	169,290	253,075	279,160
Warren	23,332	24,796	17,012	15,383	17,923	15,604	9,570	14,575
Wayne	34,000	28,084	24,293	20,840	21,200	31,578	33,600	61,835
Total	1,113,618	1,177,417	1,052,878	1,173,561	1,314,767	1,136,190	1,380,800	1,697,215

Eighteen fatal and thirty-four non-fatal accidents have been reported to the office during the last two years. Forty-four per cent of the fatal accidents are to be ascribed to the explosion of coal dust at the Chicago and Iowa mine, and twenty-seven per cent of the non-fatal accidents were caused by the same calamity.

TABLE OF FATAL ACCIDENTS

In District No. 1, for the two years ending June 30, 1893.

DATE.	NAME OF DECEASED.	CAUSE OF DEATH.	MINE WHERE ACCIDENT OCCURRED.	MINE OPERATED BY—
July 5, 1891	Charles Frostburg	Fall of slate	Phillips No. 2	Phillips Fuel Company.
December 5, 1891	Willis Woodruff	Hit by flying coal from shot	Smoky Hollow	Smoky Hollow Coal Company.
December 30, 1891	Charles Meppins	Fall of slate	Jack Oak	Iowa & Wisconsin Coal Company.
February 19, 1892	John Swaney	Fall of slate	Baker's	Baker Coal Company.
March 25, 1892	John Gresham	Fall of rock	Appanoose	Phillips Fuel Company.
October 14, 1892	R. Walsh	Falling down shaft	Ashton's	H. H. Ashton.
January 4, 1893	Ed. Mutchler	Fall of slate	Burch Mine	Burch Bros.
January 27, 1893	Peter Quist	Fall of slate	Iowa & Missouri	Iowa & Missouri Coal Company.
February 14, 1893	Joseph Gallagher	Coal dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
February 16, 1893	John Robinson	Effects of dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
February 16, 1893	P. Gallagher	Effects of dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
February 16, 1893	Jas. Graham	Effects of dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
February 19, 1893	R. H. Parago	Effects of dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
March 3, 1893	Jas. Graham, Jr.	Effects of dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
March 4, 1893	Oliver Garland	Effects of dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
March 8, 1893	Wm. Napier.	Effects of dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
March 7, 1893	Chas. Grant.	Effects of dust explosion	Chicago & Iowa	Chicago & Iowa Coal Company.
June 27, 1893	E. R. Bagley	Fall of slate	Hawkeye	Hawkeye Coal Company.
		Heart trouble	Wapello No. 1	Wapello Coal Company.

NON-FATAL ACCIDENTS.

District No. 1.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
July 28, 1891	Wm. Morgan	Trackman	Slightly bruised	Fall of rock	Foster.
July 28, 1891	Wm. Irwin	Miner	Hand cut and eye bruised	Fall of slate	Foster.
Septemb'r 16, 1891	Wm. Vancleave	Miner	Leg broken	Fall of slate	Foster.
Septemb'r 16, 1891	D. W. Jones	Miner	Ankle sprained	Fall of slate	Foster.
October 9, 1891	Thos. Richards	Mule driver	Leg broken	Car jumping the track	Albia.
October 10, 1891	Geo. Leggett	Miner	Left foot mashed	Fall of coal	Albia.
October 12, 1891	Jules Glorenix	Miner	Badly burned	Powder explosion	Albia.
December 2, 1891	Eugene Welsh	Miner	Hands and face burned	Premature explosion of shot	Albia.
December 2, 1891	John J. Kelley	Miner	Hands and face burned	Premature explosion of shot	Albia.
December 3, 1891	Frank Vivan	Miner	Back bruised and foot mashed	Shot breaking through	Albia.
December 3, 1891	John Brown	Miner	Foot mashed	Fall of coal	Albia.
April 5, 1892	Claude Bell	Miner	Leg broken	Kettle bottom fell on him	Centerville.
August 24, 1892	John Beadle	Miner	Leg broken and wrist splintered	Fall of slate	Albia.
Septemb'r 15, 1892	Dan. Martin	Miner	Head and chest bruised	Fall of slate	Brazil.
August 24, 1892	John Ferguson	Miner	Sprained ankle	Fall of slate	Mystic.
August 24, 1892	Wm. Orr, Sr	Pit boss and owner	Head bruised and knee wrenched	Fall of slate	Mystic.
Septemb'r 21, 1892	Dan. Thompson	Mule driver	Bruised hip	Feet got tangled in chain	Keb.
Septemb'r 26, 1892	W. D. Loe	Miner	Broken collar bone and back fractured	Fall of coal	Forbush.
Septemb'r 29, 1892	Chas. Kellogg	Mule driver	Leg broken	Caught in moving car	Foster.
October 3, 1892	R. Poindexter	Mule driver	Hip bruised	Caught between two cars	Keb.
October 5, 1892	John C. Thomas	Laborer	Thumb mashed	Rock fell on his hand	Hiteman.
December 14, 1892	R. O'Donnell	Miner	Leg broken	Fall of coal	Cedar Mines.
January 12, 1893	R. W. Thomas	Miner	Leg broken	Fall of coal	Centerville.
February 14, 1893	Chas. Long	Miner	Hands slightly burned	Coal dust explosion	Cedar Mines.
February 14, 1893	Cal. Anderson	Miner	Face and hands burned and lungs affected	Coal dust explosion	Cedar Mines.
February 14, 1893	John Dennis	Miner	Face and hands burned and lungs affected	Coal dust explosion	Cedar Mines.
February 14, 1893	Ben. Weir	Miner	Face and hands burned and lungs affected	Coal dust explosion	Cedar Mines.
February 14, 1893	David Wolf	Miner	Face and hands burned and lungs affected	Coal dust explosion	Cedar Mines.
February 14, 1893	Samuel Hopkins	Miner	Face and hands burned and lungs affected	Coal dust explosion	Cedar Mines.
February 14, 1893	Robert Woods	Helper to miner	Face and hands burned and lungs affected	Coal dust explosion	Cedar Mines.
February 14, 1893	Thos. Irwin	Helper to miner	Face and hands burned and lungs affected	Coal dust explosion	Cedar Mines.
February 14, 1893	Geo. Johnson	Helper to miner	Face and hands burned and lungs affected	Coal dust explosion	Cedar Mines.
May 15, 1893	Wm Dalzalle	Miner	Leg broken	Fall of slate	Foster.
April 24, 1893	Ivan Racki	Miner	Thigh broken	Fall of rock	Rathbun.

RECAPITULATION.

FATAL ACCIDENTS.

Number.	CAUSE OF DEATH.	PER CENT.
1	Hit by flying coal	5.5
1	Falling down shaft	5.5
1	Heart trouble	5.5
1	Coal dust explosion	5.5
7	Effects of coal dust explosion	39.0
7	Fall of slate	39.0
18		100.0

NON-FATAL ACCIDENTS.

Number.	CAUSE OF ACCIDENT.	PER CENT.
12	Fall of slate	35.0
4	Hurt by mine cars	12.0
5	Fall of coal	15.0
1	Powder explosion	3.0
2	Premature explosion of shot	6.0
1	Shot breaking through pillar	3.0
9	Coal dust explosion	26.0
34		100.0

A life was lost for every 171,004 tons of coal produced, and a non-fatal accident occurred for every 90,531 tons mined.

RAILROAD MINES OPENED AND ABANDONED IN THE LAST TWO YEARS.

All the new mines opened are located in Appanoose county; they are:

Rathbun, operated by the Star Coal Co., of Streator, Ill. Anchor No. 2, operated by the Anchor Coal Co. Big Four, operated by the Big Four Coal Co. Happy, operated by the Happy Coal Co. Columbia, operated by the Columbia Coal Co.

At Mystic the Peerless Coal Co. has opened a new slope; at the same place the Mystic Fuel Co. is putting two mines in operation, and the Blackrod Coal Co. has finished a new slope. At Darbyville the Superior Block Coal Co. and the Evans Coal Co. are opening up. At Jerome the Gladstone Coal Co. has sunk a shaft. At

Diamond the Hazelton Coal Co. has commenced business, and at Cincinnati three shafts have been completed by the Atwell Coal Co., D. Boyer & Co., and the Streator Coal Co., respectively.

MINES ABANDONED.

In Appanoose county, the Cleveland mine, operated by the Cleveland Coal Co.

In Wapello county, Willard, operated by the Phillips Fuel Co., and the Hawkeye mine, operated by the Hawkeye Coal Co.

The number of improvements made in the last year at the mines is very gratifying. Seven fans have been put up, five sets of safety catches put on, eight safety gates were erected, five bonnets were placed over the cages, five drums were provided with brakes, fifteen air shafts and thirteen escape shafts were sunk, seven stairways were built and eight new furnaces put in.

SCALES TESTED.

I have tested four sets of scales. One was found to be absolutely correct; the others required from two hundred to five hundred pounds to break them and were ordered overhauled, adjusted and made to weigh correctly.

As a rule the mines in this district are equipped with all the safety appliances required by law, and in most cases they were found in good condition.

The ventilation in some of the mines was found to be excellent and enough air in entering nearly all of them to give every man employed the amount required by law, but on account of leakage caused by faulty stoppings many working places are insufficiently ventilated. These stoppings are generally built with slate and dust, and when first put up may not leak air, but their usefulness is soon gone, especially in mines where powder in large quantities is used, unless they are continually watched and repaired. All stoppings, and especially those between the main intake and return should be built of brick or planks and sand between them. It may seem a little expensive to do this, but it should be remembered that good air is just as essential to the success of a mine as good roads and good machinery.

RECOMMENDATIONS.

I would respectfully recommend that the following changes be made in the mining law:

First—That chapter 46, laws of 1890, relating to escape shafts and mines employing ten men or less, be repealed.

I see no reason why the miner working in a small mine should be discriminated against by the law. As a matter of right and justice

he ought to have the same protection that is given to his fellow-workman who labors in a large mine. A repeal of this law does not necessarily mean that the operator of a small mine must equip it with expensive appliances or go out of business, but it does mean that he can be restrained by law from working his mine in such manner as to place the health and life of his employes in jeopardy.

Second—That to insure greater safety to the miners in case the buildings over the hoisting shaft should burn down, hereafter no fan be allowed to be erected in connection with the hoisting shaft.

Since the mining law has come in force in this State many changes have been made in it. In places it is contradictory. At every recurring session of the legislature portions of it have been either amended or repealed. I would recommend the appointment of a commission, composed of operators and miners, to revise the law, and that the law so revised be submitted to the next general assembly for approval.

This revision would have a beneficial effect on the mining industry of the State. It would put a stop to agitation and would reduce the necessity for further mining legislation to a minimum for years to come.

Names of companies or individuals operating in Adams county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
Harishorn Bros.	Eureka, Iowa.
J. M. Hinton	Eureka, Iowa.
Ingersoll & Spurrier	Eureka, Iowa.
Cullen, Rees & McKee	Carbon, Iowa.
Carbon Coal Company	Carbon, Iowa.
Wm. Ruth	Carbon, Iowa.
Gibbie Bros.	Carbon, Iowa.
Chafee & Company	Carbon, Iowa.
R. Hathaway	Carbon, Iowa.
Hart & Caldwell	Carbon, Iowa.
J. T. Wilds	Carbon, Iowa.
Geo. Plowman	Briscoe, Iowa.
W. R. Miller	Briscoe, Iowa.

Names of companies or individuals operating mines in Appanoose county location of principal office and postoffice address.

NAME.	POSTOFFICE.
Diamond Coal Company	Centerville, Iowa.
Eldon Coal Company	Ottumwa, Iowa.
Anchor Coal Company	Centerville, Iowa.
National Coal Company	Centerville, Iowa.
Standard Coal Company	Centerville, Iowa.
Skandinavian Coal Company	Centerville, Iowa.
Centerville Coal Company	Centerville, Iowa.
Lane Coal Company	Centerville, Iowa.
Tipton Coal Company	Brazil, Iowa.
Phoenix Coal Company	Brazil, Iowa.
Philby Coal Company	Brazil, Iowa.
Walnut Block Coal Company	Centerville, Iowa.
B. F. Silknetter	Centerville, Iowa.
Cincinnati Cos Company	Cincinnati, Iowa.

Names of Companies, etc., Appanoose county—Continued.

POSTOFFICE.	NAME.
Appanoose Coal Company	Cincinnati, Iowa.
Thistle Coal Company	Cincinnati, Iowa.
Big Four Coal Company	Jerome, Iowa.
Gladstone Coal Company	Jerome, Iowa.
Hazelton Coal Company	Mystic, Iowa.
Columbia Coal Company	Diamond P. O., Iowa.
Peerless Coal Company	Centerville, Iowa.
Walnut Creek Coal Company	Mystic, Iowa.
Brown & Bowers	Mystic, Iowa.
Lone Star Coal Company	Mystic, Iowa.
Iowa & Missouri Coal Company	Mystic, Iowa.
Orr Bros	Mystic, Iowa.
C. L. Arnot	Mystic, Iowa.
Lodwick Bros	Mystic, Iowa.
Clarkdale Coal Company	Mystic, Iowa.
Star Coal Company	Streator, Illinois.
Evans Coal Company	Darbyville, Iowa.
Darby Coal Company	Darbyville, Iowa.
Superior Block Coal Company	Darbyville, Iowa.
Whitebreast Fuel Company	Ottumwa, Iowa.
Pearl Coal Company	Mendota, Missouri.
Happy Coal Company	Centerville, Iowa.
Wm. Cree	Centerville, Iowa.
Monitor Coal Company	Centerville, Iowa.
Eagle Coal Company	Brazil, Iowa.
R. Campbell	Brazil, Iowa.
S. Houser	Seymour, Iowa.
R. Parker	Livingston, Iowa.
M. Conanal	Mystic, Iowa.
R. D. Whalen	Mystic, Iowa.
Jas. Thorp	Mystic, Iowa.
Raven Coal Company	Cincinnati, Iowa.
Atwell Coal Company	Cincinnati, Iowa.
D. Boyer & Company	Cincinnati, Iowa.
Streator Coal Company	Cincinnati, Iowa.
Mystic Fuel Company	Mystic, Iowa.
Blackrod Coal Company	Mystic, Iowa.
Fenton Bros	Millidgeville, Iowa.
A. Stockdick & Company	Millidgeville, Iowa.
Wm Martin	Centerville, Iowa.

Names of Companies or individuals operating mines in Davis county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
Ely Dye	Eldon, Iowa.
Thomas Dial	Laddsdale, Iowa.
J. B. Fite	Eldon, Iowa.
Warren Graham	Belknap, Iowa.

Names of Companies or individuals operating mines in Lucas county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
Lucas & Cleveland Co-operating Coal Company	Lucas, Iowa.
Lucas Coal Company	Lucas, Iowa.
I. H. Smith	Chariton, Iowa.

Names of companies or individuals operating mines in Monroe county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
Wapello Coal Company	Hiteman, Iowa.
Chicago & Iowa Coal Company	Cedar Mines, Iowa.
Enterprise Coal Company	Albia, Iowa.
Iowa & Wisconsin Coal Company	Albia, Iowa.
Whitebreast Fuel Company	Ottumwa, Iowa.
Smoky Hallow Coal Company	Avery, Iowa.
G. A. Pierson	Frederic, Iowa.
Frederic Coal Company	Frederic, Iowa.
Deep Vein Coal Company	Foster, Iowa.
Hickory Coal Company	Hickory, Iowa.
A. B. Little	Coalfield, Iowa.
J. C. Moyle	Avery, Iowa
J. Brewer	Albia, Iowa.
Will De Far	Albia, Iowa.
Geo. Hartzer	Albia, Iowa.
W. King	Albia, Iowa.

Names of companies or individuals operating mines in Page county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
Geo. Howard	Shambaugh, Iowa.

Names of companies or individuals operating mines in Taylor county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
Campbell Coal Company	New Market, Iowa.
Anderson & Sons	New Market, Iowa.
Chas. Adams	New Market, Iowa.
Powell & Lathrop	New Market, Iowa.
Wm. H. Bean	New Market, Iowa.
Nathan Wilcox	Villisca, Iowa.
Wm. Burnside	Villisca, Iowa.

Names of companies or individuals operating mines in Wapello county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
Whitebreast Fuel Company	Ottumwa, Iowa.
John Daniels	Ottumwa, Iowa.
Baker Coal Company	Ottumwa, Iowa.
Phillips Fuel Company	Ottumwa, Iowa.
Lumsden Coal Company	Ottumwa, Iowa.
Burch Bros.	Ottumwa, Iowa.
South Ottumwa Coal and Mining Company	Ottumwa, Iowa.
Eldon Coal Company	Ottumwa, Iowa.
W. C. Williams	Ottumwa, Iowa.
W. A. Waddel	Kirkville, Iowa.
Major & Jordan	Blakesburg, Iowa.

Names of companies or individuals operating mines in Warren county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
S. W. Bennum	Summerset, Iowa.
D. K. Jones	Summerset, Iowa.
Caldwell & Cassiday	Summerset, Iowa.
Dixon & Price	Ford, Iowa.
N. Bales	Milo, Iowa.
J. W. Brown	Milo, Iowa.
Jos. Mitchell	Milo, Iowa.
Lumsden & Son	Carlisle, Iowa.

Names of companies or individuals operating mines in Wayne county, location of principal office and postoffice address.

NAME.	POSTOFFICE.
Chicago Coal Company	Seymour, Iowa.
Seymour Coal Company	Seymour, Iowa.
Jas. A. Winger	Harvard, Iowa.
Wm. Burns	Confidence, Iowa.
Lewis Frye	Confidence, Iowa.
John Matley	Confidence, Iowa.
B. F. Jared	Confidence, Iowa.
Aaron Radcliffe	Confidence, Iowa.
R. M. Davis	Confidence, Iowa.

DESCRIPTION OF THE MINES OF THE FIRST DISTRICT.

APPANOOSE COUNTY.

This county is the first in this District with regard to number of mines in operation and second as to output of coal. It contains seventy mines, sixty-two of them shipping all or part of their output. The coal is of excellent quality, about two feet six inches thick, having very little dip and is easy of access. The deepest shaft in the county is only 160 feet deep and a large portion of the coal can be won by drifts or slopes. With few exceptions the mines are dry. The systems of working are room and pillar, modified longwall and longwall proper. The last method is undoubtedly the best and there are but few mines in the county where it may not be successfully employed to the great advantage of operator and miner It is a conservative estimate that where this system is not in use, between 30 and 40 per cent of coal is left in the mines, which means heavy losses to the party owning the coal and to the operator, and an abnormal shortening of life of the coal field. By its adoption the operator will gain an increased output with less expense, the miner will produce the coal in better shape with more ease and will have better air to work in and the land owner can afford to take less royalty and still have an increased income. Everyone connected with the coal business in this county should thoroughly investigate the system and by visiting the mines where it is in successful operation, enough proof can be had to establish the fact that it is the most economical way to produce the coal.

Five railroads, namely, the Chicago, Burlington & Kansas City, the Chicago, Rock Island & Pacific, the Keokuk & Western, the Chicago, Milwaukee & St. Paul, and the Iowa Central, afford excellent facilities to distribute the output of coal in every direction.

The growth of the coal industry in this county has been phenomenal. Five years ago a trifle over 200,000 tons were produced per annum, while in the year ending June 30, 1893, the output has been increased to 631,875 tons. From present indications it looks, that after the lapse of a few more years proud Mahaska, that has been the banner coal producing county in the State for many years, will be forced to take second place.

DIAMOND No. 2.

A shaft 140 feet deep, located at Numa, on the Chicago, Rock Island & Pacific railroad, and operated by the Diamond Coal Company. A number of improvements have been added to the plant during the last year. A fan 12 feet in diameter ventilates the mine. Volume of air, 12,000 cubic feet per minute. Number of men employed, 42.

A. DARGAVEL,
Superintendent.

ELDON No. 2.

A shaft 145 feet deep, located at Shawville, on the Chicago, Rock Island & Pacific railroad, and operated by the Eldon Coal & Mining Company. The mine is equipped in compliance with the law, and is ventilated by a double Murphy fan. The ventilation is good. Volume of air, 12,750 cubic feet. Number of men inside, 48.

JOHN MORRIS,
Superintendent.

ANCHOR No. 2.

A shaft 155 feet deep, located near Centerville, on the Chicago, Rock Island & Pacific railroad, and operated by the Anchor Coal Company. This mine was opened late last fall. An air and escape shaft is in process of sinking and a fan will be used to ventilate the mine as soon as the air shaft is completed. The equipments about the mine are in good order.

JAMES WILSON,
Superintendent.

NATIONAL.

A shaft 147 feet deep, located at Centerville, on Chicago, Rock Island & Pacific railroad, and, until it burned down early this year, operated by Green & Pearson. The tipple and engine house are rebuilt, and the mine will soon be in operation again.

STANDARD.

A shaft 135 feet deep, located at Centerville, on the Chicago, Rock Island & Pacific and Keokuk & Western railroads. The appliances comply with the law. A new air and escape shaft of liberal dimensions has been sunk 2,800 feet north of hoisting shaft. It is the intention of the company to remove the fan from the main shaft to this air shaft in the near future, thereby improving the ventilation of the mine greatly. The coal is conveyed to the main shaft by means of a tail-rope. Volume of air, 6,475 cubic feet. Number of men, 73. The mine is operated by the Standard Coal Company.

G.W. MERRITT,
Superintendent.

DIAMOND No. 1.

A shaft 138 feet deep, located at Centerville, on the Chicago, Rock Island & Pacific railroad and operated by the Diamond Coal Company. The equipments are in good order. Three Legg and two Harrison machines run by compressed air are used to mine and cut the coal. Haulage is done by tail-rope. The mine is ventilated by a fan. Ventilation fair. Volume of air, 12,000 cubic feet. Number of men employed, 42.

A. DARGAVEL,
Superintendent.

SKANDINAVIAN.

A shaft 110 feet deep, located at Centerville, on the Keokuk & Western railroad, and operated by the Skandinavian Coal Company. The mine is in good shape. A new escape shaft has been sunk 480 feet from the main shaft. Ventilation by fan. Volume of air, 14,690 cubic feet. Number of men employed, 73.

CLAUS JOHNSON,
Superintendent.

ANCHOR No. 1.

A shaft 70 feet deep, located near Centerville, on the Keokuk & Western railroad, and operated by the Anchor Coal Company. The mine is equipped with good machinery, and the safety appliances conform with the law. It is aired by furnace, which has a capacity of about 6,000 cubic feet per minute, but on account of neglect on the part of the furnace-tender, only 2,300 cubic feet were found on last visit to the mine. A fan is now in course of erection. Number of men employed, 32.

JAMES WILSON,
Superintendent.

RELAY.

A shaft 107 feet deep, located near Centerville, on the Keokuk & Western railroad, and operated by the Centerville Coal Company. Two Legg and one Harrison machines are used to mine part of the output. A shaft will be sunk north of main shaft, on the Iowa Central, and connected with its workings, and it is also the intention of the company to connect the south-side shortly with the shafts formerly operated by E. J. Richardson, but now the property of the company. This arrangement will afford splendid facilities to better the ventilation, and at the same time provide the men with means of escape close to the workings, in case of danger. The mine is ventilated by fan. Volume of air, 4,832 cubic feet. Number of miners, 50.

R. H. EASTON,
Superintendent.

LANEVILLE.

A shaft 75 feet deep, located 1½ miles east of Brazil, on the Keokuk & Western railroad, and operated by the Lane Coal Company. The mine is in fair order, lawfully equipped. Ventilated by furnace. Volume of air, 1,800 cubic feet. Number of men employed, 15.

L. LANE,
Superintendent.

TIPTON.

A slope, located at Brazil, on the Keokuk & Western railroad, and operated by the Tipton Coal Company. Ventilated by furnace. Ventilation was found deficient on account of a too shallow furnace shaft, and by reason of leakage. An air shaft has been sunk near the head of the workings, providing now a good supply of air for the men. Volume of air, 1,140 cubic feet. Number of men employed, 26.

THOMAS PHILLIPS,
Superintendent

PHŒNIX.

A slope, located at Brazil, on the Keokuk & Western railroad, and operated by the Phœnix Coal Company. Mine in good shape. Volume of air, 2,280 cubic feet. Number of men, 27.

JOSEPH TURNER,
Superintendent.

PHILBY.

A slope, located at Brazil on the Keokuk & Western railroad and operated by the Philby Coal Company. Ventilated by furnace. The air is well conducted to the working places. Volume of air, 4,687 cubic feet. Number of men, 20.

JOHN ARCHIBALD,
Superintendent.

WALNUT BLOCK No. 1.

A slope, located at Brazil on the Keokuk & Western railroad and operated by the Walnut Block Coal Company. Furnace ventilation. Air deficient at working places. Volume of air, 2,800 cubic feet. Number of men, 31.

WALNUT BLOCK No. 2.

A slope, located as No. 1 and operated by the same company. Ventilated by furnace. Volume of air, 2,475 cubic feet. Number of men, 21.

WALNUT BLOCK No 3.

A slope, situated near Brazil and operated by above company. Mine in fair shape. Ventilated by furnace. Volume of air, 4,400 cubic feet. Number of men employed, 24.

J. E. LEE,
General Manager.

SILKNETTER.

A slope located at Brazil on the Keokuk & Western railroad. Ventilated by furnace. Mine in fair condition. Volume of air, 5,000 cubic feet. Number of men employed, 26.

B. F. SILKNETTER,
Superintendent.

TIPTON SLOPE.

On Keokuk & Western railroad, near Brazil, operated by the Tipton Coal Company. Has splendid air shafts; furnace ventilation. Volume of air, 9,100 cubic feet. Number of men, 19.

THOMAS PHILLIPS,
Superintendent.

CINCINNATI.

A shaft located at Cincinnati and operated by the Cincinnati Coal Company. Is not worked extensively in the summer. Shaft and equipments are in fair order. Ventilated by grate.

C. C. CALKER,
Superintendent.

APPANOOSE.

A shaft 160 feet deep, located at Cincinnati, on the Chicago, Burlington & Kansas City railroad. Ventilated by fan. Ventilation somewhat deficient. Equipment in fair order. Volume of air, 2,880 cubic feet. Number of men employed, 35.

J. N. MARSH,
Superintendent

THISTLE.

A shaft 110 feet deep, located at Cincinnati, on the Chicago, Burlington & Kansas City railroad. New machinery for hoisting purposes. Equipments lawful. Ventilated by furnace. A new and larger furnace will be put in to increase the ventilation. Volume of air, 3,000 cubic feet. Number of men employed, 34.

D. STEELE,
Superintendent.

BIG FOUR.

A shaft 127 feet deep, sunk last fall, located at Jerome, on the Chicago, Milwaukee & St. Paul railroad, and operated by the Big Four Coal Company. The coal is hoisted by steam power; safety appliances are in good order; at present ventilated by steam jet, but as soon as the new air and escape is completed a fan will be erected. Number of men employed, 30.

WM. OUGHTON,
Superintendent.

GLADSTONE No. 1.

A shaft 100 feet deep located 1½ miles northeast of Jerome, on the Chicago, Milwaukee & St. Paul railroad, and operated by the Gladstone Coal Company. A fire, cause unknown, destroyed the dump house and part of the shaft on the 13th of November, 1891. Everything was rebuilt immediately and by the 7th of December, 1891, hoisting coal was resumed. The mine is ventilated by grate; amount of air per minute, 2,970 cubic feet; 32 men employed.

R. MARSDEN,
Superintendent.

GLADSTONE No. 2.

A shaft recently sunk, located at Jerome, on the Chicago, Milwaukee & St. Paul railroad, and operated by the Gladstone Coal Company. The shaft is one of the largest in the county and will be equipped to handle a large output of coal.

R. MARSDEN,
Superintendent.

HAZELTON.

A shaft, 70 feet deep, located near Diamond, on the Chicago, Milwaukee & St. Paul railroad, and bought recently by the Hazelton Coal Company. A slope has been sunk west of the shaft to the coal, and an entry is in progress connecting them.

WILLIAM LEE,
Superintendent.

COLUMBIA.

A slope, near Diamond postoffice, on Chicago, Milwaukee & St. Paul railroad owned by the Columbia Coal Company. It is a new mine, opened this year, and is ventilated by furnace. Volume of air, 2,000 cubic feet. Number of men, 16.

WILLIAM BAKER,
Superintendent.

DIAMOND.

A shaft, 50 feet deep, located at Diamond, on the Chicago, Milwaukee & St. Paul railroad. The equipments comply with the law. The main entry is very

wet and muddy. Mining machines run by electricity have been in use in this mine, but they are not operated now. Ventilation is had by furnace and steam jet. Volume of air, 4,800 cubic feet. Number of men, 35.

THOMAS PHILLIPS,
Superintendent.

PEERLESS No. 1.

A slope, located at Mystic on the Chicago, Milwaukee & St. Paul railroad, ventilated by furnace. Volume of air 4,830 cubic feet; 48 men employed.

PEERLESS No. 2.

A slope, located same as No. 1. Ventilation by furnace. Volume of air per minute, 2,600 cubic feet; 21 men employed.

PEERLESS No. 3.

A slope, located near No. 2, equipped in the last year with a new furnace and air shaft, and the ventilation is fair.

PEERLESS No. 4.

A shaft 30 feet deep, located 1½ miles southwest of Mystic on the Chicago, Milwaukee & St. Paul railroad, and ventilated by furnace. Volume of air, 2,930 cubic feet; 28 men employed.

PEERLESS No. 5-6.

Two shafts sunk a short distance apart. Depth, 40 feet. Located near Mystic. The mines have underground connection and the coal is hoisted at No. 6. Ventilation by furnace. Volume of air per minute, 6,300 cubic feet. Number of men employed, 47.

PEERLESS No. 7.

A slope located east of No. 2, at Mystic. Just opened.

The above mines are operated by the Peerless Coal Company. With the exception of No. 7 all have escape ways as the law provides, either by slopes or shallow shafts.

J. E. LEE,
Superintendent.

WALNUT CREEK.

A slope located near Mystic, on the Chicago, Milwaukee & St. Paul railroad and operated by the Walnut Creek Coal Company. A new air shaft has been sunk near the workings. The mine is ventilated by furnace. Volume of air, 4,950 cubic feet. Number of men employed, 30.

THOMAS DE FRANCE,
Superintendent.

BROWN & BOWERS.

A slope located at Mystic, on the Chicago, Milwaukee & St. Paul railroad and operated by Brown & Bowers. Ventilated by furnace. Volume of air, 4,620 cubic feet; 53 men employed. On January 19 6,400 cubic feet of air were entering the mine; on February 7 (an extremely cold day) 15,000 cubic feet. Above deficiency was caused by the course being temporaily closed on second east entry.

GEORGE YOUNG,
Superintendent.

LONE STAR.

A slope, located at Mystic, on the Chicago, Milwaukee & St. Paul railroad, and operated by the Lone Star Coal Company. Mine in fair shape. Ventilated by furnace. Volume of air, 4,140 cubic feet. Number of men 43.

JOHN SEDDON,
Superintendent.

IOWA AND MISSOURI.

A slope, located at Mystic, on the Chicago, Milwaukee & St. Paul railroad, and operated by the Iowa and Missouri Coal Company. Coal is brought to the surface by means of a tail-rope. Ventilated by furnace. Volume of air per minute, 12,600 cubic feet. Number of men employed, 100.

JAS. TUSCON,
Superintendent.

ORR'S SLOPE.

Located at Mystic, on the Chicago, Milwaukee & St. Paul railroad, and operated by Orr Brothers. It is ventilated by furnace. Volume of air, 2,822 cubic feet. Number of men employed, 27.

ORR'S SHAFT.

Depth 73 feet, located 1¾ miles east of Mystic, on the Chicago, Milwaukee & St. Paul railroad, and operated by Orr Brothers. Equipments are in good shape, and escape is according to law. Ventilated by steam jet. Volume of air per minute, 7,700 cubic feet. Number of men employed, 26.

A. ORR,
Superintendent.

ARNOT.

A slope located at Mystic, on the Chicago, Milwaukee & St. Paul railroad, and operated by C. L. Arnot. A new air shaft has been sunk and a new furnace erected, ventilating the mine in a fair manner. Volume of air, 9,600 cubic feet. Number of men employed, 33.

W. M. OUGHTON,
Superintendent.

LODWICK No. 1.

A slope located at Mystic, on the Chicago, Milwaukee & St. Paul railroad, and operated by Lodwick Bros. Volume of air, 3,000 cubic feet. Number of men employed, 39.

LODWICK No. 2.

A slope located and operated as No. 1. Volume of air, 4,455 cubic feet; 47 men employed. A new slope is being driven and in time all coal mined by this company will be brought through it to the surface. Steam haulage will be employed.

L. LODWICK,
Superintendent.

CLARKDALE.

A shaft 70 feet deep, located two miles east of Mystic, on Chicago, Milwaukee & St. Paul railroad. Equipments are lawful. Ventilated by furnace. Volume of air, 3,520 cubic feet. Number of men employed, 11.

A. CLARK,
Superintendent.

RATHBUN.

A shaft 82 feet deep, located at Rathbun, on the Chicago, Milwaukee & St. Paul railroad and operated by the Star Coal Company (main office at Streator, Illinois). The mine was opened last year and will be worked on the long wall plan as soon as they are through the faulty coal they are working at present. The air has been very deficient, but as a cyclone fan 10 feet in diameter has been lately put up this evil will be remedied. The equipments are of good order and comply with the law; 80 men are employed.

C. RATHBUN,
Superintendent.

EVANS.

A shaft newly opened, east of Rathbun, on the Chicago, Milwaukee & St. Paul railroad. It is ventilated by furnace.

DARBY.

A shaft 50 feet deep, located at Darbyville, on the Chicago, Milwaukee & St. Paul railroad, and operated by the Darby Coal Company. The mine is ventilated by steam jet. Employs at present about 10 men. Volume of air, 3,200 cubic feet per minute.

B. B. STUFF,
Superintendent.

SUPERIOR BLOCK Nos. 1 AND 2.

Two slopes just opening up, located at Darbyville on the Chicago, Milwaukee & St. Paul railroad, and operated by the Superior Block Coal Company.

B. J. MALLORY.
Superintendent.

WHITEBREAST No. 19.

A shaft 65 feet deep, located at Forbush, on the Iowa Central railroad, and operated by the Whitebreast Fuel Company. It is the best equipped mine inside and outside in the county, and will have a capacity this winter of 600 tons daily. The long wall system is an assured success here. A number of mining machines have been in use here formerly, when the mine was worked on the room and pillar plan, but since changing the method of working they have been taken out. The mine is well ventilated by a double Murphy fan. Number of men employed, 111. Volume of air per minute, 31,875 cubic feet.

T. J. PHILLIPS,
General Superintendent.
JACOB HOLLAND,
Superintendent.

There are a number of mines in the county employing less than ten men in the summer time, and only twelve or fourteen during the winter season. As a rule they compare favorably in regard to equipments, etc., with the mines having a larger output and employing a greater number of men. The following companies ship part of their output.

The Pearl Coal Company, mine located at Pearl City, on Chicago, Burlington & Kansas City railroad.

The Happy Coal Company, mine located at Centerville.

The Monitor Coal Company, mine located at Centerville.
The Star Coal Company, mine located at Centerville.
The Eagle Coal Company, mine located near Brazil.

The following mines are operated almost entirely for local trade :

R. Campbell, S. Houser, B. Parker, N. Moran, R. D. Whalen, M. Connal and James Thorp, giving employment to from 2 to 6 men each during the winter.

That the development of Appanoose county's coal fields is rapid indeed may be seen by the number of new mines that are now pushed vigorously to completion. All will be connected with the railroads by side-tracks.

The Raven Coal Company is now sinking at Centerville, on the Chicago, Rock Island & Pacific railroad. The Atwell Coal Company, D. Boyer & Co., and the Streator Coal Company have the shafts completed at Cincinnati and will make connections with the Chicago, Burlington & Kansas City railroad.

At Mystic the Mystic Fuel Company has one slope far enough for cross-entries and a shaft nearly sunk. The Blackrod Coal Company, at the same place, is getting in shape to ship coal before long. These places are connected with the Chicago, Milwaukee & St. Paul by a switch and tramways.

MONROE COUNTY.

This county has twelve mines shipping coal by rail besides a number of small ones around Albia operated for local trade in the winter. The output is shipped over the Chicago, Burlington & Quincy railroad, the Iowa Central railroad, and the Chicago, Milwaukee & St. Paul railroad. The coal which runs from 3½ to 6 feet in thickness, is worked on the room and pillar system, is a splendid steam coal, in good demand for locomotive use and will stand the weather well. This county is rapidly coming to the front as a coal producer. During the two years ending June 30, 1891, 664,879 tons were mined, while in the two years ending June 30, 1893, 1,163,590 tons were brought to the surface, an increase of 498,711 tons. Nearly all the mines are excellently equipped, have expensive machinery and the latest improvements to handle coal rapidly.

WAPELLO No. 1.

A shaft 142 feet in depth, located at Hiteman, is connected with the main line of the Chicago, Burlington & Quincy railroad by a switch three miles in length, and operated by the Wapello Coal Company. It has the largest output in the county, its capacity being 800 tons of lump coal daily. The equipments are of the best order. Ventilation by fan. Volume of air per minute, 39,200 cubic feet. Number of men and boys employed, 361.

H. L. Waterman,
General Manager.

CHICAGO & IOWA.

A shaft 125 feet deep, located near Albia, on the Chicago, Burlington & Quincy railroad, and operated by the Chicago & Iowa Coal Company. The equipments comply with the law. This is the mine the disastrous explosion occurred in last February. It is ventilated by furnace; ventilation fair. Volume of air per minute, 13,100 cubic feet. Number of men employed, 75.

W. G. Richardson,
Superintendent.

ENTERPRISE.

A shaft 115 feet deep, located near Albia, on the Chicago, Burlington & Quincy railroad, and operated by the Enterprise Coal Company. It is ventilated by fan. Equipments in fair order. Volume of air per minute, 6,160 cubic feet. Number of men employed, 41.

Thos. Lewis,
Superintendent.

JACK OAK.

A shaft 170 feet deep, located near Albia, on the Chicago, Burlington & Quincy railroad, and operated by the Iowa & Wisconsin Coal Company. Ventilation by fan; volume of air, 12,950 cubic feet. Number of men, 75.

D. H. McMillan,
Superintendent.

WHITEBREAST No. 10.

A shaft 128 feet deep, located at Chisholm, on the Chicago, Burlington & Quincy railroad, and operated by the Whitebreast Fuel Company. When the company bought the mine it was in a deplorable condition, but they have put forth a decided effort to better it. Ventilation by fan ; volume of air per minute, 11,800 cubic feet. Number of men employed, 77.

T. J. Phillips,
General Superintendent.
Rich Rosser,
Superintendent.

SMOKY HOLLOW.

A slope near Avery, on the Chicago, Burlington & Quincy railroad, operated by J. Z. Evans. Everything in and about the mine in good condition. Ventilation good. Ventilated by fan; volume of air, 15,500 cubic feet. Number of men, 135.

P. Hynes,
Superintendent.

PIERSON.

A shaft 58 feet deep, located near Frederic, and operated by G. A. Pierson. Coal is hauled in wagons to Frederic and loaded on the cars. Ventilation good. Equipments according to law. Ventilated by grate; volume of air per minute, 7,600 cubic feet. Fifteen men employed.

G. A. Pierson,
Superintendent.

FREDERIC COAL COMPANY.

A shaft 42 feet deep, located near Frederic, and operated by Frederic Coal Company. The coal is hauled to Frederic. The mine is wet. Ventilation by grate. Nine men employed. Volume of air, 2,800 cubic feet.

C. Akers,
Superintendent.

DEEP VEIN COAL COMPANY No. 1.

A shaft 208 feet deep, located at Foster, on Chicago, Milwaukee & St. Paul railroad, and operated by the Deep Vein Coal Company. Equipments in good order. Ventilated by fan; volume of air per minute, 28,500 cubic feet. Number of men employed, 161.

C. H. Fugle,
Superintendent.

HICKORY.

A shaft 76 feet deep, located at Hickory, on the Iowa Central railroad, and operated by the Hickory Coal Company. Has the best manway in the county, and is ventilated by fan; volume of air, 6,050 cubic feet. Men employed, 29.

C. N. BLOOMFIELD,
Superintendent.

A. B. LITTLE.

A slope located near Coalfield, on the Iowa Central railroad, and operated by A. B. Little. Mr. Little has improved the mine considerably since he bought it, and it is in fair shape now. Ventilated by fan run by rope gearing; volume of air, 6,000 cubic feet. Number of men employed, 38.

A. B. LITTLE,
Superintendent.

J. C. Moyle is operating a new mine near Avery.

J. Brewer, Will. ‡De Tar, George Hartzer and W. King are working small mines near Albia in the winter.

WAPELLO COUNTY.

This county has now only four mines shipping coal by rail; they are located on the Chicago, Rock Island & Pacific railroad, the Chicago, Milwaukee & St. Paul and the Chicago, Burlington & Quincy. The decrease (2) was caused by the Hawkeye being worked out and the mine at Willard burning down, still the output shows an increase over the former biennial period of 65,486 tons. A number of mines close to Ottumwa are doing a good business supplying the local demand. The coal in this county is from 4 to 6 feet thick and is worked on the room and pillar plan.

Considerable prospecting is being done and the presumption is that new coalfields will be found and developed, and that the mineral wealth of the county will last for many years to come.

WHITEBREAST No. 22.

A shaft 90 feet deep, located at Keb, on a branch off the Chicago, Burlington & Quincy railroad, and operated by the Whitebreast Fuel Company. The mine is equipped well, and in shape to produce a large output. The fan has a capacity larger than any in the district. Volume of air per minute, 49,200 cubic feet. Number of men employed, 225.

T. J. PHILLIPS,
General Superintendent.
JOHN RYAN,
Superintendent.

PHILLIPS No. 2.

A shaft 100 feet deep, situated near Ottumwa, on the Chicago, Milwaukee & St. Paul railroad, and operated by the Phillips Fuel Company. A new air shaft has been put down this spring. The mine is ventilated by fan. Volume of air, 11,000 cubic feet. Number of men employed, 58.

WM. FOULKS,
Superintendent.

APPANOOSE.

A shaft 95 feet deep, located at Willard on the Chicago, Milwaukee & St. Paul railroad, and operated by the Appanoose Coal and Fuel Company. Ventilated by fan. Volume of air per minute, 7,425 cubic feet. Number of men employed, 18.

ELDON No. 1.

A shaft 75 feet deep, located at Laddsdale, on the Chicago, Rock Island & Pacific railroad, and operated by the Eldon Coal Company. For about a year this mine has been worked in faulty coal and the expense to the company has been heavy. Prospects to reach a paying body of coal are brightening. The equipments comply with the law. Ventilated by fan. Volume of air, 11,000 cubic feet. Number of men employed, 27.

J. T. BEARD.
Superintendent.

Of the mines selling coal locally the following are the most prominent:

BLACK DIAMOND.

A shaft 60 feet deep, located near Ottumwa, and operated by the Lumsden Coal Company. Everything in good condition at this mine. Ventilation by furnace. Volume of air, 4,500 cubic feet. Number of men employed, 19.

JOHN LUMSDEN,
Superintendent.

BAKER'S.

A shaft 104 feet deep, located 4½ miles northwest of Ottumwa, and operated by the Baker Coal Company. Ventilated by fan.

W. J. BAKER,
Superintendent.

DANIELS'.

A shaft 122 feet deep, located 5½ miles northwest of Ottumwa, and operated by J. Daniels. While this shaft has never been worked by enough men to bring it under the law it is due Mr. Daniels to say that he keeps his mine in fair condition and in compliance with the law.

PICKWICK.

A shaft 72 feet deep, located near South Ottumwa, and operated by Burch Bros. Well ventilated; ventilation by furnace. Volume of air, 3,500 cubic feet. Number of men employed, 20.

E. D. BURCH,
Superintendent.

The South Ottumwa Coal and Mining Company operates a shaft near South Ottumwa.

W. A. Waddel, W. C. Williams and Major & Jordan are operating small mines in different part of the county.

WAYNE COUNTY.

This county has only two mines shipping by rail and these are located at Seymour. Mining in a small way is done in different parts of the county, but the greatest number of small mines is to be found in the vicinity of Confidence. The seam worked belongs to the middle coal measures, is about two feet two inches in thickness and is mined long wall. The Chicago, Rock Island & Pacific and the Chicago, Milwaukee & St. Paul railroads afford the shipping facilities.

OCCIDENTAL.

A shaft 240 feet deep, located at Seymour between the Chicago, Rock Island & Pacific railroad and the Chicago, Milwaukee & St. Paul railroad. The output can be shipped over either road. The mine is operated by the Chicago Coal Company. Air found deficient on account of narrow air courses and an air shaft too small to obtain good results. Ventilation by fan; volume of air, 5,280 cubic feet. Number of men, 65.

P. THOMAS,
Superintendent.

SEYMOUR.

A shaft 240 feet deep, located on the Chicago, Rock Island & Pacific railroad at Seymour, and operated by the Seymour Coal Company. On August 26, 1892, the entire headgear of the hoisting shaft, together with the engine house and its contents, were destroyed by fire. The origin of it is unknown. Two men were in the mine when the fire occurred, but made their way out safely through the escape shaft. They have rebuilt since, and the equipments are all new and in good order. A fan has recently been added to the improvements and the mine is now well ventilated.

GEO. ELMORE,
Superintendent.

Jas. A. Winger is operating a mine at Harvard.

The following are working mines in the vicinity of Confidence: Wm. Burns, Lewis Fry, John Matley, B. F. Jarrett, Aaron Radcliffe, R. M. Davis and Wm. Rousseau.

ADAMS COUNTY.

This county has no railroad mines. Twelve shafts are worked in the northern part of the county, principally at Carbon, Eureka and Briscoe, to supply the local demand for coal. In the summer season they are doing hardly anything in the way of mining, but during a hard winter the demand greatly exceeds the supply. The coal is about sixteen inches in thickness, is of superior quality, remarkably free from impurities, and a good stocker. The mines are worked on the long wall system, and as the workings on account of the thinness of the vein never extend far from the shaft, are fairly well ventilated. The equipments are generally of the crudest kind, and the mining law in regard to them is a dead letter here. Still the spirit of progress and improvement is moving some of the mine owners to action, and, while the law cannot compel them to do so under existing circumstances, they will have their mines in better shape than formerly by the time the fall trade begins. The average number of men employed during a year in any of these mines is about six.

At Carbon seven mines are operated. The names of the operators are Cullen, Rees & McKee, Gibson Bros., W. Rush, Gibbie Bros., J. F. Wilds, Barker & Brooks, and R. Hathaway.

At Eureka mines are operated by Hartshorn Bros, J. M. Hinton, and Ingersoll & Spurrier.

At Briscoe, in the extreme northwest corner of the county, two mines are worked. Geo. Plowman and Jos. Briscoe are the operators.

WARREN COUNTY.

A number of small mines are worked in this county for local trade. They are located near Milo, Lacona, Indianola and Summerset. Nearly all are operating only in the fall and winter, and rarely employ more than four men each even in the buisiest season. Bennum's mine, and the shaft operated by D. K. Jones near Summerset, gives employment to about 10 men each in the winter. At Ford, in the northeast corner of the county, is one mine that has facilities for shipping coal over the Chicago, Burlington & Quincy railroad, but the business it does is very limited. The coal is from 20 inches to three feet in thickness, and is mined on the long wall and the room and pillar plan. The mines in this county cannot be considered to be amenable to the mining law for the reason that they do not employ the requisite number of men.

With better railroad facilities to western points Warren county would soon become prominent as a coal producer, but, until that event takes place, its yearly output will show little, if any, increase. A list of the operators and their post-office address is given elsewhere.

TAYLOR COUNTY.

All the mines in this county are located near New Market. Three of them, namely: Anderson's 2 and 3 and Campbell, ship part of their output over the Humeston & Shenandoah railroad; the others supply local trade only. The vein is sixteen inches thick, is of fair quality and is worked long wall.

ANDERSON No. 2.

A shaft 130 feet deep, operated by Anderson & Sons. Ventilated by furnace; volume of air, 3,400 cubic feet. Number of men employed, 11.

ANDERSON No. 3.

A shaft 120 feet deep, operated by Anderson & Sons. Ventilated by furnace; volume of air, 3,400 cubic feet. Number of men, 14. These mines are kept in fair condition.

W. ANDERSON,
Superintendent.

CAMPBELL

A shaft 120 feet deep. Number of men employed, 6.

Charles Adams operates a mine near New Market and employs 10 men in the winter.

Powell & Lathrop operate two shafts.

LUCAS COUNTY.

Once the second coal producing county in the State, with an output of over a half million tons per annum, it has now taken a position almost at the foot of the list. At present only two insignificant mines are struggling along to keep the name of Lucas county from being wiped out altogether from the roster of Iowa's coal producing counties. There is no question that coal in paying quantity can be found here, but the reason for not developing it seems to be that the expense account to reach it would show up rather heavy. Be that as it may, the time will come when the coal fields of Lucas county will again give employment to hundreds of men.

At present coal is taken out at Lucas and Cleveland. A vein two feet in thickness, belonging to the middle coal measures, is worked. Part of the output is shipped over the Chicago, Burlington & Quincy railroad and part is used for home consumption. The coal is of good quality and there is no reason why it may not be worked profitably.

LUCAS.

A shaft 83 feet deep, located at Lucas, and operated by the Lucas Coal Company. Equipments comply with the law. New air shaft with stairway in it. Ventilated by fire basket. Volume of air, 2,110 cubic feet. Number of men employed, 24.

THOMAS CROSTON,
Superintendent.

CLEVELAND.

A shaft 60 feet deep, located at Cleveland, and operated by the Lucas & Cleveland Co-operative Coal Company. Equipments are lawful. Ventilated by furnace. Volume of air, 2,150 cubic feet. Number of men employed, 20.

WM. JENKINS,
Superintendent.

A few small drift mines are worked during the winter near Chariton.

DAVIS COUNTY.

This county contains only a few mines, worked solely for local trade. The coal is from two to four feet thick and is worked room and pillar.

PAGE COUNTY.

A local mine is in operation near Shambaugh. The vein of coal worked belongs to the upper coal measures and is very thin. Its greatest thickness does not exceed 18 inches. The coal is worked on the long wall method.

THE EXPLOSION AT CEDAR MINES.

On the 14th day of February, 1893, at about 6 o'clock P. M., a disastrous explosion occurred in the Chicago and Iowa mine, located about two and one-half miles west of Albia, on the main line of the Chicago, Burlington & Quincy railroad, in Monroe county. The mine is operated by the Chicago & Iowa Coal Company, Mr. W. P. Jones, manager, and W. G. Richardson, mine boss. The mine has been in operation about sixteen years, is worked on the room and pillar system, and entries are driven double. All the work going on now is to the south, over 1,000 yards distant from the hoisting shaft. The mine is ventilated by furnace. The last inspection of the mine before the explosion was made on November, 29, 1892. At that date 60 miners and 20 day men were employed. The working places, with few exceptions, were found to be well ventilated, an air current of 12,200 cubic feet per minute passing through the mine; the stoppings and doors were in good repair and the plant was in fair condition generally.

The explosion was caused by a blown out shot fired in room No. 7, on the second west entry (see plat), and it was the most serious that ever did occur since mining has begun in Iowa. One miner, Joseph Gallagher, was killed outright, seven others died at their homes after suffering the most excruciating pains, and nine more were more or less seriously injured.

The explosion occurred on a Tuesday evening, but I received no notice of it until the Thursday morning following. I immediately went to Albia, where I met Mr. Canty, inspector of district No. 2, who had heard of the accident in Ottumwa, and who had come on to offer his assistance which was very gratefully accepted. We heard that an inquest had been held on the body of Joseph Gallagher, so we went to the coroner's office to look over the verdict and to examine the testimony given at the inquest. This testimony was found to be of a very meagre and unsatisfactory character, being principally confined to the finding of the body, leaving the cause or causes of the disaster

very obscure. Of course the verdict was given in accordance with the testimony adduced. Word was brought in that three more men had just died from the effects of the explosion. On hearing this I asked the coroner to hold another inquest Friday afternoon and that in the mean time we would examine the mine thoroughly and would be present at the examination of the witnesses. To this arrangement Dr. S. T. Gray, the coroner, readily assented.

Early Friday morning, February 17th, Mr. Canty and I arrived at the Chicago & Iowa mine. No work had been done and nobody had been allowed to enter the mine without permission since the explosion. In company with the mine boss, W. G. Richardson, and several others, we went down the shaft and proceeded to examine the mine. Everything was in its proper place at the bottom of the shaft. The fire in the furnace had died out, but the natural current provided sufficient ventilation. Proceeding southward, we could detect nothing unusual until we came to the parting about 150 feet north from the mouth of the second west entry. This parting is about fourteen feet wide. Here we found the first signs of the explosion. Small particles of coked dust had been driven into the timbers, and the wood itself was found slightly scorched. A little ways further on we found lamps, caps, dinner pails and canteens strewn about in a promiscuous manner. Presently we arrived at the mouth of the second west entry, the place where poor Joseph Gallagher met instant death. It seems that the tremendous rush of wind just preceeding the explosion caught him in the narrow neck near the mouth of the second west, picked him up bodily and dashed him against the opposite rib. The place where his body struck the coal was clearly defined, and so great was the force with which he was thrown, that the body rebounded and fell across the track.

Entering the second west we found the first visible damage done to the mine. An overcast, constructed of planks, spans the second west, conveying the air from the workings further south to the return air course. The top of this overcast was lifted about six inches from the frame. Everywhere around here soot and coked dust could be noticed. Arriving at the mouth of No. 7 room, the place where the explosion originated, we found the north rail on the entry opposite the mouth completely covered with dust and fine coal that had been driven from the face of the room, a distance of sixty feet. An empty car was standing across the switch with the front bar considerably bent. On examining the face of the room found that only one shot had been fired. It had blown the tamping and a portion of the coal near the mouth of the hole had been blown off. Inquiry brought

out the fact that this hole had been fired at noon, February 14, but had failed to do its work; that in the afternoon it was drilled about eighteen inches further, charged with seven or eight pounds of powder and fired again that evening. About five feet of the hole remained. The shot was a very heavy one; it was fully six feet across the point in the middle, top and bottom projecting still further. It was a shot poorly placed and slovenly prepared. For tamping dry drilling dust had been used and the powder ignited by fuse.

The rooms in the vicinity of No. 7 were then examined. It became apparent that all the men inside this room had fired their shots, while the shots in the rooms outside of it were all left unfired, showing that the shots were fired in rotation, allowing the inside men to come out without being compelled to travel through powder smoke. By going through the rooms outside of No. 7 we found that wherever fuse was used to fire the shots dry drilling dust was the material they were tamped with, put in the holes so loosely that in some instances the needle could be pushed through it without any difficulty. The boxes kegs and tins containing blasting powder were next looked after, but there were no indications that any powder contained in these vessels had been exploded by the blaze.

The extent of the explosion was a limited one. It extended from room No. 7, east to the mouth of the second west, a distance of about 350 feet, thence north to parting, about 180 feet traveling against the air current, then, according to the testimony of R. Thomas and others, the blaze turned back, going as far south as the curtain hung between the fifth and sixth east entries, which was found burned in several places, and west along the second west up to room No. 12, where it burned the hands of a miner by the name of West. The whole distance traveled over by the blaze was therefore in the neigborhood of 800 feet. It was confined almost entirely to the entries, and the men who were within a hundred feet of the seat of the explosion and remained in their rooms escaped without injury. All the injured and killed were overtaken between room 7 and the parting on the main south, while on their way home, traveling along the entry.

That the blaze turned back after reaching the parting was plainly indicated by the condition of a tool box, standing near the mouth of No. 6 room, on the entry, was found in. The sides of this box facing east and west were scorched and blistered by the heat and on the cleats, nailed near the bottom, fine coal dust in a coked condition had accumulated by falling down the sides of the box after having been driven against them by the blast. The sides facing north and south showed scarcely any signs of fire and no accumulation of dust whatever.

Having completed our investigation in the mine we returned to Albia to be present at the inquest to be held on the bodies of John Robinson, James Graham and Patrick Gallagher. A number of witnesses had been subpœnaed and in the main the examination of them was conducted by Mr. Canty and myself. I regret very much that, being unable to procure a shorthand reporter in the town to take down the questions propounded and answers given, we had to do the best we could under the circumstances, one of the jurors acting as clerk. Dr. Gray made the statement that the death of the deceased was caused by the inhalation of hot air and fire, causing inflamation and congestion of the bronchial tubes so as to stop up the air passage, producing thereby asphyxiation and death. Eight witnesses were examined and I give their testimony in a condensed form. The testimony shows that all the men who were seriously burned were at the time of the explosion either near the mouth of the second west entry or between it and the parting on the main south. James Hall testified that he had mined coal for forty-two years, had worked in gaseous mines, but had never noticed any gas in this mine. He was in his room (No. 1), when the explosion took place, saw the fire passing the mouth of his room and noticed the sparks falling to the floor. Rich. Thomas stated that when the blaze took a backward course the sparks were settling down like snow falling. Wm. Fleming, who worked in No. 6 room, said that the explosion started in room No. 7, but as there is no cross-cut between these two rooms, the fire did not enter his place. All the witnesses examined, who were in the habit of using fuse to fire their shots, thought it a dangerous practice to tamp with dry drilling-dust, but did so in order to not injure the fuse. Four witnesses testified that the roads were sprinkled at night and one stated that the second west entry was not very damp on the day of the explosion. W. G. Richardson said, that in his opinion the explosion was an explosion of dust, and that it was brought about by not dressing the coal properly before blasting; by the excessive use of powder and by using improper material for tamping.

The verdict of the jury will be recorded elsewhere in this report.

By special request I again visited the mine on the 21st day of February, in company with Mr. M. G. Thomas, mine inspector of District No. 3, and Mr. J. T. Beard, mining engineer. This was one week after the explosion. No work had been done yet in the mine and everything was practically in the same condition in the territory affected by the explosion, when it was first looked over by Mr. Canty and myself. These gentlemen made a careful examination of the mine and their observations and deductions have since been given to the public. The articles written by them will repay careful perusal.

The most able and experienced men in matters pertaining to mining, the commissions appointed by different governments in Europe to inquire into and devise means to avoid the dangers surrounding the mining of coal, all agree that the presence of fine coal dust in mines where fire damp exists, and where powder is used, is an element of great danger. The coal dust in the mines of Iowa is non-explosive *per se*, but that under certain conditions it can be made the means of destruction and death, is a fact proved beyond a doubt by the recent explosions in our mines. In order to have matters as plain as possible, we will divide the subject into sections and will consider separately 1, The cause of dust explosions; 2, The time most favorable to their occurrence; 3, The place in the mine where they most likely will occur, and 4, How to prevent them.

First—Dust explosions in this State and elsewhere are almost entirely brought about by blown out shots, and the more disastrous ones were in two cases out of three occasioned by holes that had blown the tamping once, but which had been recharged and fired again. No practical tests, so far as I am aware, have ever been made to show why a shot that has been charged the second time and blown the tamping again, is more dangerous than the shot that did blow the tamping the first time, but the fact remains nevertheless, that such is the case. At shaft No. 11 at McAllister, I. T., at Pekay and Cedar Mines, Iowa, and at Como, Col., one hundred lives were lost in the aggregate through dust explosions caused by blown out shots that had been charged and fired the second time. These shots had blown the tamping the first time without injury to any one, and the question arises what agent made them so disastrous the second time.

Powder, when exploded, generates a number of gases, twenty per cent of which are of an explosive nature. Now, these gases, when a shot is fired will diffuse in equal proportion in all directions, and if the shot brings down the coal, will mix with the air and become harmless, but if the shot should blow the tamping, these gases will be driven into the coal surrounding the back of the hole and remain there until released. If the hole is charged again and fired the result is that we have now between thirty-five and forty per cent of explosive gases, when we formerly had only twenty per cent, and the consequence will be that the flame will attain a greater elongation and an increased intensity of heat, just the requirements necessary to ignite the dust, and if in addition the hole has been tamped with dry drillings the danger of an explosion becomes most threatening.

The idea has been advanced by some that the brand of powder used has much to do with causing these explosions. I will state that at Rich Hill, Missouri, at the time of the dust explosion there, Laflin &

Rand's powder was in use, at No. 11 shaft, McAllister, I. T., the same brand, at Cedar Mines, Iowa, the Oriental and the Phœnix, and at Pekay, Iowa, Dupont's F. I submit this statement without comment.

Second—The time most favorable to dust explosions is between the first of October and the last of March. Investigation has shown that ninety per cent of them have occurred during that period. The reason for this is obvious. In the winter time the cold air entering the mine absorbs the heat and moisture contained in the strata, and leaves them in a very dry state, while in the summer the outer air having a higher temperature than is found in the mine, upon entering it will condense and deposit moisture in every direction, in every nook and crevice, in rooms and entries alike, keeping the dust damp all over the mine, and preventing it from being raised in clouds by the firing of shots.

Third—The most likely place for a dust explosion to occur is near the intake, and the higher the velocity of the air current the more disastrous will the explosion be. In this particular it is different from an explosion of fire damp, for the latter as a rule only occurs when the volume of air is not large enough to dilute the gas and thereby render it harmless. I do not want to be understood as favoring a reduction in the volume of air entering the mine to lessen the danger, for other means can be employed to do that, but I merely state what is susceptible of proof. Men well versed in mining affairs oppose the claim that an explosion of dust is more likely to take place near the intake than in any other part of the mine, and they also hold that the greater the volume of air the less the damage will be; and in order to substantiate my view in this matter I will cite the following cases. All of these explosions were caused by blown out shots, and the mines in which they occurred were free from fire damp.

The Altoft explosion occurring in England in 1886, causing the death of 22 men and boys, took place on a principal intake airway 500 yards from the downcast shaft. Along this airway, 40,000 cubic feet of air per minute were passing.

The Elemore explosion of the same year, by which 28 lives were lost occurred on a principal intake airway 200 yards distant from the downcast shaft. The amount of air passing through this airway was 37,810 cubic feet per minute.

At shaft No. 11, McAllister, I. T., the explosion occurred within 400 yards from the downcast on main intake airway. Over 30,000 cubic feet per minute were passing; 63 men and boys were killed.

At Pekay, Iowa, a newly opened mine, three men were killed and the mine badly damaged by an explosion last November; 45,000 cubic feet of air are passing into the mine every minute.

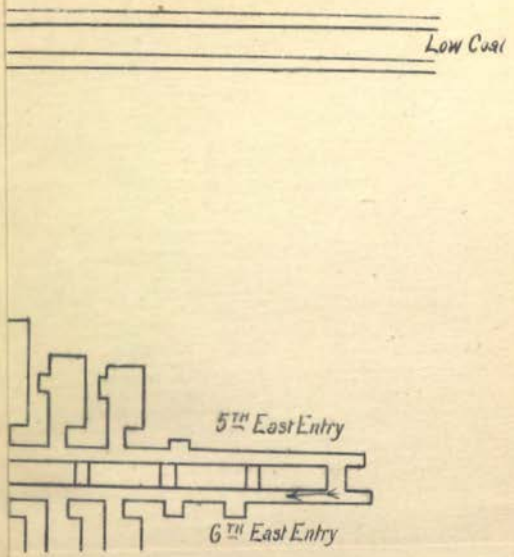
I have before me a letter from Mr. Edwin Ludlow, superintendent of mines of the Choctaw Coal and Railway Company, in which he kindly furnished me the details of the dust explosion that occurred at Alderson, Indian Territory, last March, and in which nine lives were lost. In this letter he states that the explosion took place 200 feet from the slope, down which over 60,000 cubic feet of air was passing per minute. The explosion was a most severe one. It may be said that the damage done to mining property was in direct proportion to the velocity of the air current.

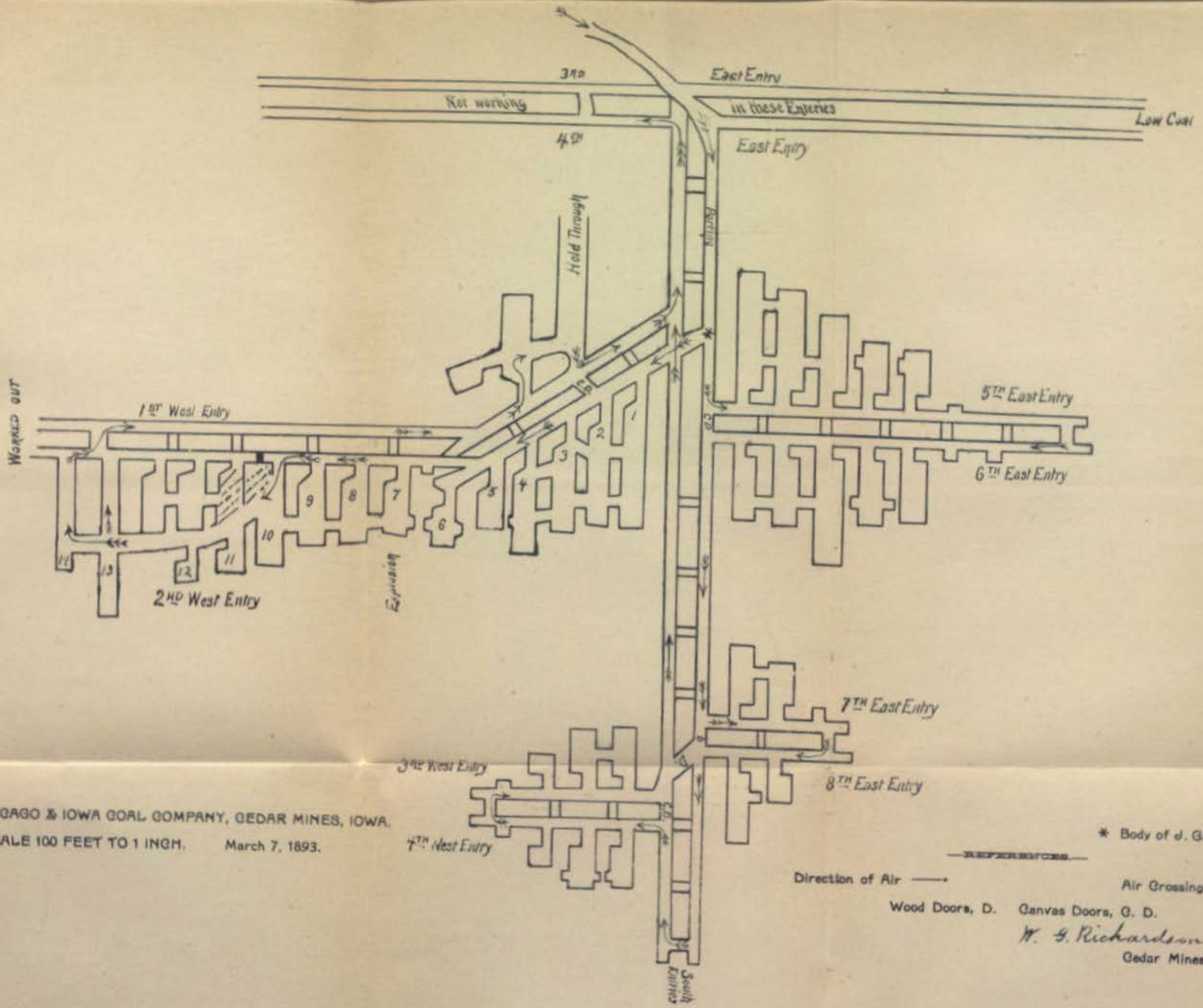
To prove still further that my position is correct we will revert again to the explosion at the Chicago and Iowa mine. Now, the damage done to the mine was almost nothing. The explosion, as all the rest, occurred on the "first of the air," but when we remember that only 12,200 cubic feet and perhaps less, were passing per minute, and when we take in consideration the fact that the explosion reached its limit near the middle of the wide parting on the main south where the air current was particularly weak, it becomes apparent that the velocity of the air current, other conditions being equal, determines the fierceness of a dust explosion.

Fourth—To prevent as much as possible a recurrence of such calamities as the above, I would suggest the following:

1. That no dust be allowed to accumulate along the entries, and that the intake airways, especially, be kept as free from it as possible.
2. That the roads be kept in a damp condition.
3. That the use of drilling dust for tamping purposes be strictly prohibited.
4. That either shot firers be employed, or that no miner be allowed to fire unless the shot has been inspected by a competent person and his consent obtained to fire the same.
5. That no hole that has blown the tamping be recharged and fired again.
6. That trials be made with flameless and safe explosives and that they be used in place of powder if found effective.

No mine can be made absolutely safe and explosions may and perhaps will occur in spite of all precautionary measures, and they may occur without the neglect or fault of any one, but I believe that, if the miners would use their best judgment and skill in preparing their shots, and the above suggestions were given due and earnest consideration it would make our mines as safe as human effort can make them.


Low Coal
5TH East Entry
6TH East Entry



MAP OF CHICAGO & IOWA COAL COMPANY, CEDAR MINES, IOWA.

SCALE 100 FEET TO 1 INCH. March 7, 1893.

* Body of J. Gallagher.

REFERENCES.

Direction of Air ——→

Air Crossings

Wood Doors, D. Canvas Doors, C. D.

W. G. Richardson.

Cedar Mines, Iowa.

BIENNIAL REPORT

OF THE

SECOND DISTRICT,

EMBRACING

JASPER, JEFFERSON, KEOKUK, MAHASKA, SCOTT AND VAN BUREN COUNTIES.

JOHN W. CANTY, INSPECTOR.

To his Excellency, HORACE BOIES, *Governor of Iowa:*

SIR—In accordance with Section 2, Chapter 140, Acts 1886, I have the honor to present to you herewith my report for Second Inspection District, for the biennial period ending June 30, 1893. This report contains the usual tables, together with the output of coal, the number of mines in operation, the number of fatal and non-fatal accidents, and such other information as I thought sufficiently important.

J. W. CANTY,
Inspector Second District.

TABLE No. 1.

Showing the number of mines, annual output, number of miners and other employes, value of product, etc., in District No. 2, for the year ending June 30, 1892.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	All other employes	Average price per ton paid for mining.	Total amount paid to miners.	Total amount paid to all other employes.	Average selling price per ton at mine.	Total value of product at mine.	Capital invested.
Jasper	16	393,350	426	142	.75	260,850.00	76,360.00	1.75	512,196	112,400.00
Jefferson	1	5,620	18	9	.83	4,183.00	1,470.00	1.80	9,036	5,150.00
Keokuk	16	315,200	526	242	.60	182,094.00	117,920.00	1.75	389,580	186,300.00
Mahaska	21	1,065,000	1,500	400	.75	637,615.00	61,800.00	1.60	1,646,151	425,500.00
Scott	1	6,950	24	8	1.00	10,150.00	1,800.00	1.40	26,355	35,400.00
Van Buren	6	27,500	41	25	.71	19,540.00	7,440.00	1.41	38,535	7,400.00
Total	73	1,695,720	2,561	801	.78	1,286,342.00	271,360.00	1.50	2,421,859	775,000.00

TABLE No. 2.

Showing number of mines, annual output, number of miners and other employes, value of product, etc., in District No. 2, for the year ending June 30, 1893.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	All other employes	Average price per ton paid for mining.	Total amount paid to miners.	Total amount paid to all other employes.	Average selling price per ton at mine.	Total value of product at mine.	Capital invested.
Jasper	16	392,000	434	141	.76	291,440.00	78,370.00	1.75	531,000	123,000.00
Jefferson	1	4,940	17	6	.85	4,393.00	920.00	1.70	8,842	5,500.00
Keokuk	15	313,000	501	227	.60	185,000.00	118,000.00	1.75	470,715	190,000.00
Mahaska	21	1,072,530	1,543	409	.74	670,530.00	154,312.00	1.43	1,670,217	720,000.00
Scott	1	14,500	47	13	1.07	15,470.00	950.00	1.75	28,315	7,400.00
Van Buren	6	28,680	62	25	.78	22,473.00	13,410.00	1.41	60,836	40,000.00
Total	69	1,784,800	2,606	907	.84	1,367,305.00	340,440.00	1.61	2,964,308	1,091,100.00

TABLE No. 3.

Showing average number of mines in operation, output of coal, average number of miners and other employes, compensation of employes, value of product, etc., in District No. 2, for the biennial period ending June 30, 1893.

NAME OF COUNTY.	Average number of mines in operation.	Number of tons of coal produced.	Average number of miners employed.	Average number of other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mines.
Jasper	16	585,350	428	142	.74	$ 442,290	$ 151,630	$ 1.75	$ 1,025,196
Jefferson	8	9,060	18	7	.85	8,538	5,660	1.80	17,578
Keokuk	16	584,400	513	298	.72	416,249	223,538	1.41	821,512
Mahaska	27	2,230,560	1,501	372	.73	1,708,135	217,382	1.41	3,122,998
Scott	6	24,950	43	11	1.05	25,620	2,750	1.70	41,506
Van Buren	6	56,010	32	24	.75	42,015	19,850	1.41	78,973
Total	71	3,480,535	2,645	854	.81	$ 2,642,847	$ 620,840	$ 1.58	$ 5,106,063

Output of coal of the counties comprising District No. 2 for the past seven years.

COUNTIES.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
Mahaska	866,548	855,981	841,762	990,325	963,558	1,048,030	1,172,530
Keokuk	599,007	541,966	364,664	268,948	263,647	312,250	292,000
Jasper	142,509	275,179	217,012	156,669	146,694	293,258	392,000
Scott	4,634	9,285	7,940	8,369	10,534	9,850	14,500
Jefferson	10,397	9,387	7,445	4,900	2,932	5,020	4,940
Van Buren	29,353	25,960	40,556	40,405	46,764	27,330	28,680
Hardin	450	1,000	136	.....	.....	.....	.....
Total	1,682,408	1,716,453	1,509,515	1,508,950	1,531,406	1,695,735	1,784,800

TABLE No. 4.

Showing list of fatal casualties occurring in mines in District No. 2, during the biennial period ending June 30, 1893.

DATE.	NAME OF DECEASED.	CAUSE OF DEATH.	NAME OF MINE.	LOCATION.
August	10, 1891 Frank Larson	Caught by shot	Consolidation No. 6	Muchakinock.
August	21, 1891 John Smalley	Fall of slate	Blind Robin No. 1	Oskaloosa.
September	8, 1891 Edward Ekstrand	Caught by shot	Diagonal No. 4	Oswalt.
October	24, 1891 David Yates	Fall of coal	Ketcham Bros	Farmington.
November	25, 1891 John Sladin	Fall of slate	Consolidation No. 7	Muchakinock.
December	8, 1891 James Grundy	Fall of slate	Vulcan	What Cheer.
December	10, 1891 George Willis	Fall of slate	Diagonal No. 3	Oswalt.
February	10, 1892 Lewis Jones	Fall of slate	Fishville	Fishville.
March	3, 1892 David Willey	Fall of slate	Jasper County	Colfax.
March	12, 1892 James Moll	Caught between two cars	Diagonal	Oswalt.
March	28, 1892 Charles Larson	Fall of slate	Consolidation No. 6	Muchakinock.
March	21, 1892 Joseph B. McKibbon	Fall of slate	Oskaloosa No. 1	Oskaloosa.
October	11, 1892 Matthew Walker	Powder and dust explosion	Carson & Walker	Douds.
November	8, 1892 William E. Llewlyn	Powder and dust explosion	Pekay	Pekay.
November	8, 1892 John Llewlyn	Powder and dust explosion	Pekay	Pekay.
November	8, 1892 Charles Meddlesworth	Caught by cage	Oskaloosa No. 1	Oskaloosa.
November	8, 1892 John Heidt	Fall of slate	Pioneer	Thornburg.
January	6, 1893 Thomas Phillips	Fall of slate	Findlay	Rastness Corner.
March	9, 1893 Thomas Medares	Fall of slate	Oskaloosa No. 2	Beacon.
April	1, 1893 Albert Dane	Fall of slate	Oskaloosa No. 2	Beacon.
April	13, 1893 Charles Pope	Caught by shot	Pekay	Pekay.
April	13, 1893 James Burdine	Fall of slate	Oskaloosa No. 2	Beacon.
May	17, 1893 Charles Olson			
June	24, 1893			

TABLE No. 5.

Showing list of non-fatal casualties of the Second Mining District for the biennial period ending June 30, 1893.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
1891.					
August 31	Howard Wilson	Mule driver	Rib broken	Fell in front of car	Oskaloosa.
October 8	David Evans	Miner	Back hurt	Fall of slate	Oskaloosa.
October 8	Thomas Owen	Miner	Back hurt	Fall of slate	Oskaloosa.
November 11	B. H. McCarthy	Miner	Back hurt	Fall of slate	Colfax.
November 18	Samuel Randall	Miner	Face and hands burned	Powder explosion	What Cheer.
November 18	Peter Roberts	Miner	Face and hands burned	Powder explosion	What Cheer.
November 18	Frank Grimes	Miner	Face and hands burned	Powder explosion	What Cheer.
November 18	Philip Genevey	Miner	Face and hands burned	Powder explosion	What Cheer.
November 18	James Conners	Miner	Face and hands burned	Powder explosion	What Cheer.
December 3	M. Kazan	Miner	Head and back bruised	Fall of slate	Carbonado.
December 5	A. F. Booth	Miner	Shoulder dislocated and rib broken	Fall of coal	Colfax.
December 8	John Allen	Miner	Internal injury	Fall of slate	Muchakinock.
December 21	Thos. Davis	Miner	Severely burned	Premature explosion of shot	What Cheer.
1892.					
January 11	Alfred Jewett	Miner	Knee sprained	Fall of slate	Muchakinock.
January 30	John Murname	Miner	Internal injuries	Fall of slate	Oswalt.
February 5	James Boggs	Miner	Ankle broken	Fall of coal	Muchakinock.
March 2	David Willey	Miner	Internal injuries	Fall of slate	Colfax.
March 15	A. Arlweiler	Miner	Leg broken	Fall of coal	Carbonado.
April 13	G. G. Johnson	Miner	Thigh and fore-arm fractured	Fall of coal	Muchakinock.
April 20	F. Shoemaker	Miner	Leg broken	Fall of coal	Beacon.
April 30	Rand Willis	Miner	Leg broken	Premature explosion of shot	Muchakinock.
May 11	A. Keys	Mule driver	Leg broken	Fell off car	Oswalt.
May 18	Wm. McLain	Miner	Leg broken	Fall of coal	Beacon.
May 25	Samuel Edwards	Miner	Back and hips bruised	Fall of slate	Fairfield.
June 9	John Reynolds	Miner	Leg broken	Fall of coal	Oskaloosa.
*September 7	John Tippitts	Miner	Internal injuries	Fall of slate	Oskaloosa.
September 16	Henry Mitchell	Mule driver	Back bruised	Mule fell on him	Carbonado.
September 20	H. Bumgartner	Miner	Head and shoulders bruised	Fall of slate	Farmington.
September 28	Thomas Roberts	Miner	Leg broken	Fall of slate	Muchakinock.
October 5	James Matthews	Miner	Elbow fractured	Fall of slate	Muchakinock.
October 11	John Adams	Mule driver	Shoulder bruised	Squeezed between car and roof	Pekay.
October 12	J. J. Sullivan	Miner	Spinal fracture	Fall of slate	What Cheer.
October 21	G. D. Cruttenden	Miner	Internal injuries	Fall of slate	Muchakinock.
November 2	William Brieker	Mule driver	Arm and rib fractured	Mule fell on him	Pekay.
November 5	William Stokes	Mule driver	Foot crushed	Car jumped track	What Cheer.
November 17	T. J. Canaday	Miner	Fractured knee	Fall of slate	Muchakinock.

*Died March 8, 1892. *The two marked by asterisks denote that they proved fatal.

LIST OF NON-FATAL ACCIDENTS OF THE SECOND MINING DISTRICT—CONTINUED.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
1892					
November	21 John McFata	Miner	Leg broken	Fall of slate	Oskaloosa.
December	26 O. Forest	Miner	Dislocated ankle	Fall of slate	Beacon.
1893					
February	13 J. T. Johnson	Mule driver	Foot mashed	Car run over his foot	Muchakinock.
February	16 John Wilson	Miner	Ankle and shoulder dislocated	Fall of slate	Excelsior.
March	25 W. M. Yates	Miner	Arm broken	Fall of slate	Farmington.
March	30 John Jones	Miner	Internal injuries	Fall of slate	Oskaloosa.
April	11 C. G. Larson	Miner	Leg broken	Coal flying from shot	Muchakinock.
May	6 Fred Drew	Not employed by company	Leg broken	Playing with cars on repair track	Muchakinock.
May	10 Thos. Perkins	Miner	Hip broken	Fall of slate	East Excelsior.
May	15 Geo. Lauritson	Miner	Slightly bruised	Break through shot	East Excelsior.
May	16 John McDonaugh	Miner	Chest bruised	Fall of slate	Carbonado.
June	12 Geo. W. Walker	Miner	Severely burned	Powder explosion	Muchakinock.
June	16 M. Ward	Miner	Slightly bruised	Fall of slate	Muchakinock.
June	22 John Bell	Mule driver	Slightly bruised	Fell under car	Muchakinock.

RECAPITULATION.

FATAL ACCIDENTS.

Number.	CAUSE OF ACCIDENTS.	PER CENT.
15	Fall of slate	62.49
3	Caught by shot	12.50
3	Powder and dust explosion	12.50
1	Fall of coal	4.17
1	By cars	4.17
1	By cage	4.17
24		100.00

NON-FATAL ACCIDENTS.

Number.	CAUSE OF ACCIDENTS.	PER CENT.
22	Fall of slate	45.9
7	Fall of coal	14.6
7	Caught by cars	14.6
6	Powder explosion	12.5
2	Premature blast	4.2
2	By mules	4.2
2	Caught by shot	4.2
48		100.0

Average number of employes 3,409, and one fatal accident for each 145,022 tons of coal mined, and one non-fatal casualty for each 72,511 tons, or one accident, fatal and non-fatal, for each 48 men employed.

SUMMARY OF WORK DONE.

During my term of office, which began May 23, 1892, I have visited the mines of this district as often as possible, and as occasion seemed to demand, and I am glad to say that where mines were found deficient in any respect little or no trouble was experienced in enforcing compliance with the law, except in two cases, one of which occurred at the Diagonal Coal Company's Mine No. 4, on January 16, 1893, where I found the escapeway, which was partitioned off the air shaft by a second partition, blocked with ice. I ordered the ice removed and escapeway put in proper condition at once which the superintendent promised to do.

I visited this mine again on the morning of the 19th and discovered that my orders had not been executed, consequently I ordered the men out of the mine until it was made to comply with the law.

On the morning of the 20th inst. the superintendent requested me to make another examination of the mine which I did and found escapeway in good condition, therefore I requested the men to resume work.

On March 23, 1893, at the Columbian Coal Company's mine No. 2 I ordered six men out of three rooms in first north entry for lack of air. When visited on the 27th the mine was found in good condition. The poor condition in which I found the above named mines was due solely to the negligence of the officials having charge of the mine, and a little timely effort on their part would have done away with the necessity of my having to resort to harsh measures.

Eighty-four improvements have been made about the mines of this district, viz: escapeways, 12; air shafts, 4; stairs in escape shafts, 12; safety gates, 22; safety catches, 12; bonnets on cages, 10; brakes on drums, 4; ropes changed, 2; fans erected, 8.

Considerable trouble was experienced in getting some of the firms in this district to repair their scales when it was found necessary to condemn them as not weighing correctly, consequently it seems to me that as the inspector is compelled to test such scales he should be empowered to have them repaired within a reasonable time.

OIL.

Next to the presence of black damp and powder smoke, the use of coal oil and inferior grades of miners' oil is most injurious to the health of the miner. It seems to me that a matter like this which could so easily be rectified by those in authority, should hardly call forth comment or criticism on my part, but it looks as though little or no effort is being made to eradicate this evil from our mines. I might cite many cases where rooms were being turned on entries through which a large volume of air was continually passing, yet places but a few feet from the entry are filled with an atmosphere so vitiated by the smoke and fumes of pit lamps, in which an inferior grade of oil is used, as to be almost unbearable. In Ohio the use of all mineral oil in the mines is prohibited by law. I respectfully recommend that such legislative action be taken, in amending our mining laws, as will prohibit the use of mineral oils, for illuminating purposes, in coal mines in this State.

SCALES TESTED.

Since May 23, 1892, I have tested twenty-nine sets of scales.

June 1, 1892. Scales at the Oskaloosa Coal Company's mine No. 1 were tested and condemned as not weighing correctly. Re-tested June 15, 1892, and found in good order.

June 18, 1892. Scales tested at Fishville mine. They were found to be correct.

July 15, 1892. Scales tested at the Armstrong mine, What Cheer. Incorrect. Reported adjusted July 18, and weighing correctly.

August 18, 1892. Tested two sets of scales at the Crescent Coal Company's mine No. 1. East scales found correct, west scales incorrect.

August 24, 1892. Tested and condemed scales at the Oskaloosa Coal Company's No. 2 at Beacon. Re-tested August 29, and found scales much improved but not correct. On September 10th I examined them again and found them in good order.

September 22, 1892. Scales tested at Diagonal Coal Company's mine No. 3. Condemned. Re-tested September 27th and approved as correct.

September 28, 1892. Scales tested at Diagonal Coal Company's mine No. 4, at Oswalt. Condemned. Re-tested September 30th and a marked improvement was found.

September 29, 1892. The scales at the Jasper County Coal Company's mine No. 2, were tested and found to be incorrect. Re-tested October 25th and found to weigh all right.

November 17, 1892. Scales tested at the Excelsior Coal Company's mine No. 5 and found in poor condition. Re-tested November 28th and approved.

November 28, 1892. Tested the scales at the Excelsior Coal Company's mine No. 4, and found them incorrect. Re-tested December 6th and approved.

December 23, 1892. Scales tested at the M. B. Foster mine at Fishville. They were correct.

February 23, 1893. Tested two sets of scales at Crescent Coal Company's mine No. 1. Both were incorrect. March 9th they were again tested and found correct.

March 11, 1893. The Iowa Fuel Company's scales were tested and found in good condition.

March 3, 1893. Scales tested at Oskaloosa Coal Company's mine No. 2. Found correct.

June 15, 1893. The Garfield Coal Company's scales at Beacon were tested and found correct.

RECOMMENDATIONS.

I would respectfully recommend that the mining law be so amended as to prohibit the erection of mechanical ventilators in connection with the hoisting shaft, and also that Chapter 46, Laws of 1890, be repealed.

I would also recommend that Chapter 54, Laws of 1888, be amended, so as to compel firms governed by the provision of the act to repair and adjust immediately such scales as may have been tested by the inspector and found not to weigh correctly.

I would further recommend that owing to the many changes needed in the present mining law, that a commission be appointed for the purpose of revising the same.

MAHASKA COUNTY.

Name of firms operating mine and post office address.

NAME OF COMPANY.	POST OFFICE.
American Coal Company	Oskaloosa.
Consolidated Coal Company	Muchakinock.
Oskaloosa Coal Company	Oskaloosa.
Garfield Coal Company	Oskaloosa.
Whitebreast Fuel Company	Pekay.
Iowa Fuel Company	Oskaloosa.
Excelsior Coal Company	Carbonado.
Long Brothers	Oskaloosa.
M. B. Foster	Fishville.
Columbian Coal Company	Rose Hill.
J. D. Guthrie	Oskaloosa.
W. N. Hoover	Carbonado.
James Newell	Muchakinock.
Michael Carey	Rose Hill.
J. G. White	Rose Hill.
William Patterson	Leighton.
S. Andrews	Oskaloosa.
Beacon Coal Company	Beacon.
Snake Creek Coal Company	Givin.
William Evans	New Sharon.
Henry Richardson	Peny.
W. Hull	Beacon.
Samuel Beam	Tracey.
J. G. Davis	Olivet.
James Greenfield	Eveland.
Richard Barrowman	Carbonado.
Moses Lewellyn	Beacon.
S. Hallowell	Tracey.
R. C. Davis	Leighton.

KEOKUK COUNTY.

Names of firms operating mines and post office address.

NAME OF COMPANY.	POST OFFICE.
What Cheer Coal Company	What Cheer.
Crescent Coal Company	What Cheer.
Pioneer Coal Company	Thornburg.
John Fairly & Company	Cory.
Thomas Armstrong	What Cheer.
Thomas Thompson	What Cheer.
William Blatt	What Cheer.
O. W. Olive	Delta.
Martin Fisher	Delta.
John Thomas	What Cheer.
Chas. Cordis	Richland.
Thos. Turnbull	Packwood.

JASPER COUNTY.

Jasper County Coal Company	Colfax.
Jas. Evans	Colfax.
John Gunter	Colfax.
Thomas Hanson	Colfax.
Brown & Price	Prairie City.
William Waddle	Prairie City.
Robert Davison	Newton.
Alfred Lister	Newton.
William Snooks	Newton.
T. F. Welsh	Newton.
Robert Carson	Newton.
William Burdess	Metz.
E. E. Edwards	Draper.
Robert Marshall	Draper.
F. J. Danks	Draper.

VAN BUREN COUNTY.

Farmington Coal Company	Farmington.
James Turner	Farmington.
Radcliff Coal Company	Farmington.
David Cox	Hillsboro.
W. R. Carson	Douds.
Geo. Findley	Douds.
Findley Bros	Douds.
E. S. Green	Douds.
Hendricks & West	Selma.

JEFFERSON COUNTY.

A. J. Zimmerman	Libertyville.
W. W. Laughlen	Libertyville.
Geo. Bates	Fairfield.
Thomas Russell	Fairfield.
J. W. Williams	Fairfield.
John Clack	County Line.

SCOTT COUNTY.

NAME OF COMPANY.	POST OFFICE.
Makin & James	Jamestown.
Blackwell & Allen	Jamestown.
C. G. Rown	Buffalo.
Fridly & Hoyt	Jamestown.
John Smith	Buffalo.

NAMES AND DESCRIPTION OF MINES IN DISTRICT NO. 2.

MAHASKA COUNTY.

With an output of 2,220,560 tons of coal for the two years ending June 30, 1893, still continues to be the largest coal producing county in the State.

Twenty-eight mines are in active operation, employing a force of 1,944 men. The principal mines, twelve in number, are located within a radius of ten miles of Oskaloosa. They are all worked on the double entry system and are equipped in the most approved manner. They have also first class railway facilities. Although eleven mines have been abandoned since 1891, the output for the biennial period ending June 30, 1893, is 267,667 tons in excess of that for the two years previous. Several new mines are being opened in and about Oskaloosa, and the prospects for the coal industry in this county are very bright.

AMERICAN COAL COMPANY,

Oskaloosa, Iowa, operates a slope mine, situated on the Washington branch of the Chicago, Rock Island & Pacific railroad at Evans, Iowa. The vein is from 5 to 6 feet thick, and is worked room and pillar. The coal is hauled to the foot of the slope by an endless rope system, about one and one-half miles in extent. The mine is ventilated by a sixteen foot fan, and has a daily output of 1,000 tons which is shipped on Chicago, Rock Island & Pacific railroad. Men and boys are employed.

W. A. McNEIL,
General Manager.
R. E. WILSON,
Superintendent.

CONSOLIDATED COAL COMPANY,

Muchakinock, Iowa, owns and operates two large mines located about two miles south of Oskaloosa. No. 6 is a shaft mine 130 feet deep, the coal is hoisted by steam and will average about 6 feet in thickness, the mine is worked under the double entry system and is ventilated in two currents by a twelve-foot fan; 230 men and boys are employed; capacity 800 tons per day. Coal shipped on Chicago & Northwestern railroad.

DANIEL REESE,
Pit Boss.
J. W. McMULLEN,
Superintendent.

Shaft No. 7, 45 feet deep is also worked under the double entry and room and pillar system, the vein being 6 feet in thickness, the coal from the south section of this mine is hauled to the shaft in trips by an endless rope, mules being employed in the north side to bring the coal to the bottom. A twelve-foot fan is used to ventilate the mine in two currents; 259 men and boys are employed. Capacity 750 tons per day.

JOHN ROBERTS,
Pit Boss.
J. W. McMULLEN,
Superintendent.

WHITEBREAST FUEL COMPANY.

Ottumwa, Iowa, owns and operates a shaft mine at Pekay, on a branch of Iowa Central railway. This mine was sunk in the spring of 1892, to a five-foot seam of coal 96 feet below the surface. This mine is opened and operated under one of the most approved systems and is ventilated by a 20-foot force fan in two currents. Two hundred and twenty-five men and boys are employed; capacity, 700 tons per day.

HARRY PARKER,
Pit Boss.
J. T. PHILLIPS.
Superintendent.

IOWA FUEL COMPANY,

Oskaloosa, Iowa, owns and operates a shaft at East Excelsior, Iowa. This mine is a new opening 148 feet deep. The coal is 5½ feet thick, and worked under the double entry system; is ventilated by a 10-foot fan in three currents. One hundred and twenty-five men employed; capacity, 300 tons.

WILLIAM REED,
Pit Boss.
E. C. SMITH,
Superintendent.

EXCELSIOR COAL COMPANY,

Carbonado, Iowa, No. 4 is a shaft mine, located on branch of Iowa Central railroad, at Carbonado; is a steam plant, shaft is 90 feet deep, coal 5½ feet thick, worked room and pillar and is ventilated by a ten-foot fan; 134 men and boys employed; capacity, 400 tons.

ROBERT STORY,
Pit Boss.
GEO. H. RAMSEY,
Superintendent.

No. 5 is also a shaft opening, situated on same branch at Carbonado, is 95 feet deep with a 6-foot seam of coal; these mines are connected under ground, and their equipments are identical; 145 men are employed; capacity, 300 tons.

HARRY SMITH,
Pit Boss.
GEO. H. RAMSEY,
Superintendent.

OSKALOOSA COAL COMPANY,

Oskaloosa, Iowa, operates two mines. No. 1 is located on Iowa Central railroad, one mile south of Oskaloosa, the shaft is 72 feet deep to coal seam, which is 5 feet thick, and worked room and pillar; 65 men are employed. Capacity, 125 tons; ventilated by 8 foot fan; coal shipped on Iowa Central railroad.

JOHN RAMSEY,
Superintendent.

Shaft No. 2 is situated two miles west of Beacon, is 40 feet deep, worked by the double entry system, and is ventilated by 10-foot fan; the coal is 6 feet thick, hoisted by steam; 130 men are employed; capacity, 400 tons.

JOHN RAMSEY,
Superintendent.

GARFIELD COAL COMPANY,

Oskaloosa, Iowa, operates a slope mine one mile west of Beacon. The output of this mine is hauled to the tipple by a tail rope, and is shipped on Chicago, Rock Island & Pacific railroad; the vein is 5 feet thick, is worked room and pillar, and ventilated by an 8-foot fan; 100 men are employed; capacity, 300 tons per day.

J. H. RAMSEY,
Superintendent.

BEACON COAL COMPANY,

Beacon, Iowa, operates a slope mine at Beacon. The coal is 5 feet thick, is worked room and pillar and ventilated by furnace. Seven men employed in winter. Coal shipped on Chicago, Rock Island & Pacific railroad.

SIMON PHILLIPS,
Superintendent.

LONG BROS,

Oskaloosa, Iowa, operate a shaft mine 90 feet deep. The coal is 6½ feet thick, worked room and pillar, and ventilated by a 6-foot fan. The output is hoised by steam and shipped on the Burlington & Northwestern railroad. Ten men are employed in summer and twenty in winter.

HENRY LONG,
Superintendent.

M. B. FOSTER,

Fishville, Iowa, operates a shaft mine 40 feet deep. The coal is from 4 to 5 feet thick; is worked by double entry system; is ventilated by an 8-foot fan in two currents. The coal is hoisted by steam and shipped on Chicago, Rock Island & Pacific railroad. Sixty-five men are employed; capacity, 200 tons.

JINKIN DAVIS,
Pit Boss.
B. F. MONTGOMERY,
Superintendent.

COLUMBIAN COAL COMPANY,

Rose Hill, Iowa, operates two mines, No. 1 was formerly operated by the Superior Coal Company. The shaft is twenty feet deep, is worked room and pillar; the coal is 5-feet thick and is hoisted by steam; is ventilated by furnace; 8 miners are employed; the coal is hauled by wagons to No. 2 mine, and shipped on Chicago & Northwestern railroad.

W. A. DURFEE,
Superintendent.

No. 2 is a shaft mine 95 feet deep, is worked room and pillar, and is ventilated by steam jet; the coal is 5 feet thick, and is hoisted by steam, and shipped on Chicago & Northwestern railroad; 26 men employed; capacity, 75 tons.

W. A. DURFEE,
Superintendent.

Postoffice, Muchakinock, Iowa. James Newell operates a slope mine for local sales. Coal is 5 feet thick: worked room and pillar; ventilated by furnace. Employs 8 men.

JAMES NEWELL,
Manager.

Postoffice, Rose Hill. Michael Carey operates a gin shaft for local sales.

MICHAEL CAREY,
Manager.

Postoffice, Rose Hill. J. G. White operates a horse and gin shaft for local sales.

Postoffice, Oskaloosa. J. D. Guthrie operates a mine for local trade. The shaft is 61 feet deep. Coal is 5 feet thick, and is worked room and pillar. Employs 10 men; ventilated by fan.

J. D. GUTHRIE,
Superintendent.

Postoffice, Carbonado. Andy Love operates a local mine.

Postoffice, Carbonado. W. N. Hoover operates a shaft mine for local trade; is a steam plant; 83 feet deep. The coal is 6½ feet thick, and is worked room and pillar and single entry. Is ventilated by fan and employs 11 men; capacity, 30 tons.

C. A. HOOVER,
Superintendent.

Postoffice, Oskaloosa. S. Andrews operates a local mine half a mile west of Oskaloosa. Employs 6 to 8 men in winter.

Postoffice, Carbonado. Richard Barowman operates small mine for local sales. Employs 3 men in winter.

Postoffice, Leighton. William Patterson operates a small local mine.

Posotffice, New Sharon. William Evans operates a small mine for local sales.

Postoffice, Feny. Henry Richardson operates a local mine.

Postoffice, Beacon. W. Hull, local mine.

Postoffice, Tracey. Samuel Ream operates a local mine.

Postoffice, Olivet. J. G. Davis, local mine.

Postoffice, Eveland. James Greenfield operates a mine for local trade in winter.

Postoffice, Tracey. S. Hallowell operates a small mine to supply local demand.

Postoffice, Leighton. A small local mine is operated.

JASPER COUNTY.

With a product of 585,255 tons, shows an increase of 283,161 tons for 1892-93 over the two previous years. The principal mines of this county are located at Colfax, and have splendid railroad facilities. The coal is about six feet in thickness but is covered with a poor roof.

At Oswalt, the Diagonal Coal Company operated two mines until March, 1893, when the company went into the hands of a receiver, and is now practically out of business. I am informed that the machinery has been sold and moved elsewhere, and it is questionable whether the mines will be operated again or not.

JASPER COUNTY COAL CO.,

Colfax, Iowa. No. 2 is a shaft opening, 60 feet deep; is worked room and pillar. The coal seam is 5½ feet thick and is hoisted by steam after being hauled to shaft bottom by a tail rope; is ventilated by two fans, one 8 feet and the other 12 feet in diameter; 130 men are employed; capacity, 400 tons per day.

HENRY THOMAS,
Superintendent.

No. 3 is also a shaft mine, 98 feet deep; coal is 5½ feet thick and is worked room and pillar; is equipped with steam hoisting plant and two ventilating fans, one 10 and the other 12 feet in diameter; 215 men and boys are employed; capacity, 750 tons per day.

HENRY THOMAS,
Superintendent.

DIAGONAL COAL COMPANY,

Oswalt, Iowa, operates two mines. No. 3 is located about one mile northwest of Oswalt; is a shaft opening, 85 feet deep. The coal is 6 feet thick, and is worked room and pillar. The mine is equipped with steam hoist and 14-foot fan; 100 men are employed; capacity, 300 tons per day.

JOHN BRANNITH,
Superintendent.

Shaft No. 4 is 65 feet deep; the vein is 5 feet thick, and is also worked room and pillar. The coal is hoisted by steam, and a 10-foot fan is used to ventilate the mine with; 65 miners are employed; capacity, 175 tons per day. Both of these mines were shut down March, 1893, and have not been started up since.

JOHN BRANNITH,
Superintendent.

JAMES EVANS,

Colfax, Iowa, operates the Little Diamond mine, 2 miles north of Colfax for local trade; employs 8 men in winter.

JOHN GUNTER,

Colfax, Iowa, operates a drift mine 3 miles east of Colfax for local sales; employs 6 men in winter.

THOMAS HANSON,

Colfax, Iowa, operates a small drift mine 3 miles east of Colfax; employs 6 men in winter; sales local.

ROBERT BROWN & JAMES BRICE,

Prairie City, Iowa, operate a slope mine 3 miles south of Prairie City; employ 8 men; sales local; steam power.

WILLIAM WADDLE,

Prairie City, Iowa, operates a local mine 3 miles south of Prairie City.

WILLIAM BURGESS,

Metz, Iowa, operates a small mine for local sales.

ROBERT DAVISON,

Newton, Iowa, operates a shaft 3½ miles south of Newton. The mine is 40 feet deep and is worked room and pillar; coal is 4 feet thick and hoisted by steam; is ventilated by furnace, and employs 12 men in winter.

ALFRED LISTER,

Newton, Iowa, operates a small gin shaft 2 miles south of Newton for local sales; employs 6 men.

WILLIAM SNOOKS,

Newton, Iowa, operates a shaft 2 miles south of Newton for local sales; coal is hoisted by steam; employs 8 men.

Postoffice, Newton. T. F. Welsh operates a small local mine about 3 miles south of Newton; employs 5 men in winter.

Postoffice, Newton. Robert Carson operates a mine three miles south of Newton to supply local trade; employs 8 to 10 men in winter; steam power.

Postoffice, Newton. T. F. Welsh operates a small mine for local sales in winter.

Postoffice, Draper. E. E. Edwards, Robert Marshall and T. J. Dank operate a small mine to supply local trade.

KEOKUK COUNTY.

The product of this county for the biennial period ending June 30, 1893, was 584,400 tons, showing a decrease of 178,165 tons. The reason of this large decrease is that eight mines in the county have been abandoned, and two more are practically worked out. There are fifteen mines, the principal ones being located on the Burlington, Cedar Rapids & Northern, and the Chicago & Northwestern railway at What Cheer. Considerable prospecting was done at Thornburg, about five miles north of What Cheer, last spring, but the deposits were not as extensive as expected, and no new mines were sunk.

Postoffice, What Cheer. The What Cheer Coal Company owns and operates three mines. No. 1 is a shaft mine, worked room and pillar and double entry; is 75 feet deep and the vein 5 feet thick, which is mined by the Harrison mining machine and hoisted by steam. This mine is just about worked out and will be abandoned in a short time. Employ 50 men; ventilated by fan; output shipped on Chicago & Northwestern railroad.

WM. TOWER,
Pit Boss.
E. M. TRESCOTT,
Superintendent.

No. 4 is also a shaft mine, located one mile north of What Cheer; is 152 feet deep; the coal is from 4 to 5 feet thick and is worked room and pillar, and hoisted by steam; the Harrison mining machine is also in use at this mine; 77 men and boys are employed; capacity, 200 tons.

WILLIAM DEMPSTER,
Pit Boss.

No. 5 is situated 1½ miles north of What Cheer, and was formerly known as the Carl mine, and passed into the hands of the What Cheer Coal Company in the spring of 1892, at which time it was fitted up with steam plant and air compressor and is wholly a machine mine; the shaft is 120 feet deep; coal 5 feet thick and is worked room and pillar, and ventilated by fan; 54 men are employed; capacity, 150 tons.

JOHN BONSTEAD,
Pit Boss.

CRESCENT COAL CO.,

What Cheer, owns and operates two mines at What Cheer, Nos. 1 and 2. No. 2 mine was worked out and abandoned June 24, 1893, and No. 1 will last but a short time.

S. W. WHITE,
General Manager.
JAMES CHEN,
Superintendent.

ARMSTRONG COAL CO.,

Operated a shaft mine, half-mile southeast of What Cheer; abandoned June 22, 1893.

SAMUEL GILDEAY,
Superintendent.

PIONEER COAL CO.,

Thornburg, operates a shaft mine, 133 feet deep. The coal is 6 feet thick, worked room and pillar; ventilated by fan; employs 75 men; capacity 200 tons per day.

THOMAS FAIRLY & COMPANY,

Cory, operate a shaft mine; employ 8 men to supply local demand.

THOMAS ARMSTRONG,

What Cheer, operates a mine at What Cheer for local trade; employs 6 men.

THOMAS THOMPSON,

What Cheer, operates a local mine; employs 7 men.

WILLIAM BLATT,

What Cheer, operates the Black Diamond mine; employs 8 men.

Postoffice, Delta. O. W. Olive and Martin Fisher operate a local mine 3 miles south of Delta.

Postoffice, Richland. Charles Cordis operates a local mine in winter.

Postoffice, Packwood. Thomas Turnbull operates a mine to supply local trade.

VAN BUREN COUNTY.

The output, 56,010 tons, for 1892-3, shows a decrease of 31,157 tons. This is due to the fact that the largest mine in the county has been abandoned.

Nine mines are now in operation, principally commercial mines.

Two new mines have been opened in the past two years, and one has been abandoned.

KETCHUM BROTHERS,

Farmington, operate a slope mine two miles north of Farmington; the vein is 4 feet thick, and is worked room and pillar and hoisted by steam; 30 men are employed; capacity, 150 tons; shipped on Chicago, Rock Island & Pacific railroad. Ventilated by furnace.

BERNARD JOHNSON,
Superintendent.

FARMINGTON COAL COMPANY,

Farmington; this mine is situated about one mile northwest of Farmington; the coal is 4 feet thick; is hoisted by horse-power; 12 men are employed, and the product shipped on Chicago, Rock Island & Pacific railroad.

JAMES SLEE,
Superintendent.

JAMES TURNER,

Farmington, operates a small mine in winter to supply local trade.

GEORGE FINDLY,

Douds, operates a drift mine; the coal is 3 feet thick; worked room and pillar; employs 10 men; capacity, 40 tons; shipped on Chicago, Rock Island & Pacific railroad; ventilated by furnace.

FINDLY BROTHERS,

Douds, operate a gin shaft; employ 7 men; coal shipped on Chicago, Rock Island & Pacific railroad.

W. R. CARSON,

Douds, operates a drift mine; employs 8 men; the coal is 3 feet thick and is shipped on Chicago, Rock Island & Pacific railroad.

E. S. GREEN,

Douds, operates a shaft mine 4 miles west of Douds to supply local trade.

HENDRICKS & WEST,

Selma, operate two small mines in winter for local trade.

SCOTT COUNTY.

The output, 24,350 tons, is an increase of 5,477 tons over 1890-91. The mines in this county do only a local business; the largest one is located at Jamestown, the coal being hauled to Davenport by wagon. The coal is about three feet thick and is worked by the single entry system.

MACKIN & JAMES,

Jamestown, operate the Orchard mine, located at Jamestown. The mine is 92 feet deep and is worked by single entry system; coal is 3 feet thick; ventilated by furnace. Employs 10 men in summer and 30 men in winter.

FELIX MACKIN,
Superintendent.

Postoffice, Jamestown. Hoyt & Fridly and Blackwell & Allen operate local mines, employing from 2 to 10 men.

Postoffice, Buffalo. Near Buffalo, C. G. Rowan, John Smith, and Thomas Webster operate local mines in winter, employing from 3 to 8 men.

JEFFERSON COUNTY.

Has an output of 9,960 tons, which shows an increase of 2,128 tons over the last two years. Six small mines are in operation and supply coal to the local trade during the winter months.

Mines abandoned in Second District during the two years ending June 30, 1893:

December, 1891, Excelsior Coal Company Nos. 2 and 3, Excelsior, Mahaska county.
Daniel Rugel, local mine; Oskaloosa, Mahaska county.
O. H. Vance, local mine; Eddyville, Mahaska county.
W. P Chillon, local; Eddyville.
A. C. Ellis, local; Givin, Mahaska county.
F. M. Whitieker, local; Oskaloosa.
James Sogne, local; Oskaloosa.

B. F. Evans, local; Oskaloosa.
June 22, 1893, Armstrong Coal Company No. 1; What Cheer.
June 24, Crescent Coal Company No. 2; What Cheer.
What Cheer Coal Company, No. 2; What Cheer, Keokuk county.
Pioneer Coal Company No. 1, local; Thornburg, Keokuk county.
John E. Morgan, local; What Cheer.
Charles Alanckquart, local; What Cheer.
John Beal local; Libertyville, Jefferson county.
November, 1893, Andy Love, local; Carbonado, Mahaska county.
March, 1893, Ketchum Brothers No. 2; Farmington, Van Buren county.
April, 1893, Jasper County Coal Company No. 2; Colfax, Jasper county.
Andy Love, local; Carbonado, Mahaska county.
Number of mines abandoned, 19.

NEW MINES OPENED.

April 1892, Whitebreast Fuel Company No. 28; Pekay, Mahaska county.
July, 1892, Iowa Fuel Company No. 1; East Excelsior, Mahaska county.
John Griffith, local mine; Givin, Mahaska county.
Findly Brothers, local; Douds, Van Buren county.
September, 1892, Jasper County Coal Company No. 3; Colfax, Jasper county.
Hendricks & West, local mine; Selma, Van Buren county.
Columbian Coal Company No. 2; Rose Hill, Mahaska county.
Thomas Armstrong, local mine; What Cheer.
1893, John Thomas, local; What Cheer.
Number of new mines opened, 9.

On the evening of November 8, 1892, a serious explosion occurred in mine No. 28, of the Whitebreast Fuel Company, located at Pekay, Mahaska county, at about 4:40, while the shots were being fired in south section of the mine, which resulted in the death of John and William Llewlyn and Charles Meddlesworth. The mine was opened in the spring of 1892, and at the time of the explosion gave employment to 110 men and boys. The accompanying drawing shows the system by which the mine was worked and ventilated, together with sketch of Llewlyn brothers' room, and section of third and fourth east where Meddlesworth was found.

By a most fortunate circumstance the mine was idle and only eight men were at work when the explosion took place, or the loss of life would have been appalling. I was informed by those who were near the mine when the explosion took place, that at about 4:40 P. M. a heavy concussion was felt and a dense volume of dust and soot were seen to issue from the main shaft; a few seconds later the cover was blown off the air shaft and the fan wrecked. Realizing that an explosion had occurred, preparations were made to repair the fan while a rescue party was lowered into the mine. At shaft bottom four men were found uninjured who had been seated in the stables when the explosion took place. On north side a short distance from shaft, a miner who worked on north side was picked up in an unconscious condition, and was immediately taken to the surface where he soon recovered. Shortly after the dead bodies of John and William Llewlyn were discovered, one in the east sump or cage landing and the other under a loaded car on the north side, frightfully mangled. The Llewlyn brothers worked in No. 2 room, third west south entry, and while on their road home after lighting their shots, were overtaken by the explosion and hurled to shaft bottom where they were found dead. Charles Meddlesworth, a miner working in No. 5 room, third east south entry, was missing, and an attempt was now made to reach the third east in search of him. But as the explosion had occurred in this section of the mine, it was found to be full of after damp, and the ventilation deranged. Consequently it was some three hours later when they succeeded in getting a current of air in circulation, and the mine clear of the deadly gases resulting from the explosion, that the rescue party was enabled to reach the fourth east entry where the dead body of Meddlesworth was discovered, on the entry opposite No. 5 room, horribly burned. When found he was in a kneeling position with his hands pressed to the side of his face and his head to the east. Meddlesworth upon lighting his shot in No. 5 room, third east, passed through the cross cut into the fourth east, to wait there until his shot would go off, and while on his knees opposite No. 5 room was

overtaken by the explosion which resulted in his death. I was informed by H. Parker, pit boss, that only four shots were fired in the mine on the evening of the explosion, one in No. 5 room, third east, and three in Llewlyn brothers' place, No. 2 room, third west entry. And that the Llewlyn brothers took a keg of powder in the mine on the morning of the 8th inst., and about 4:00 P. M. they borrowed five pounds more from William Freeman and George Box, two miners working in fourth west. About 4:20 P. M. Freeman and Box visited Llwelyns' room and found them engaged in charging and tamping holes marked 1,203 on appended sketch of room.

During the four days I spent at this mine investigating the cause or causes which led to this explosion, I was assisted at different times by General Superintendent T. J. Phillips, of the Whitebreast Fuel Company, Mr. Parker, pit boss, State Mine Inspector John Verner of the First District, G. S. Rice, M. E., George Box, William Freeman, and a number of miners whose names I can not now recall. On descending into the mine and turning south unmistakable evidence of a terrific explosion could be seen on all sides. The roadways were strewn with debris, and in many places were almost impassable. Mine cars were reduced to atoms, doors and stoppings blown out, tool boxes torn apart and the contents scattered along the entries, together with kegs of powder, of which not less than five and one-half kegs are thought to have exploded. In No. 2 room third west entry we found that three holes had been fired there as stated by Box and Freeman, and that shots Nos. 2 and 3 were overcharged with powder can not be doubted, when we take into consideration the manner in which the coal liberated by those shots was hurled against the east rib and neck of the room. The fact that twenty-two per cent of shot No. 2 was found on the solid after being fired is evidence that it was a blown out shot in part (see appended sketch). The drills in use in this mine are from three to three and one-half inches in diameter, and the holes invariably tamped with fine, dry coal drillings and fired by fuse, consequently shots similar to the above are of quite frequent occurrence, and in some instances doors and stoppings are broken down by the concussion of what is termed windy shots.

From this room we trace the course of the explosion east into main south entry. The door in cross-cut, connecting third west and main south was broken down, which allowed the fire wave to pass with air current into main south, then north into fourth east. On the entry just inside No. 4 room, a tool box was moved east about twenty feet, nearly up to mouth of No. 5 room, where Meddlesworth was found. In the cross-cut connecting third and fourth east entries, a tool box

containing a half keg of powder was picked up and hurled against the third entry rib, burst open and the half keg of powder exploded. At this point we made an examination of Meddlesworth's room and ascertained that only one light shot was fired there on the evening of the 8th instant. A loaded car that was left standing about twelve feet inside of mouth of third east was found overturned in main south entry. From this point the explosion rushed north, blowing the stopping between these entries into the *intake air course*. Two hundred and fifty feet north of third east a powder keg was picked up, burst open, and four similarly bursted kegs were found in first and second west south entries. At mouth of second west the explosion seems to have divided, part of it going in the second west and the balance in direction of hoisting shaft. In third west it traveled against the air current for about one hundred and fifty feet to the door in cross-cut connecting these entries, which it blew from its hinges into the air course. The stoppings between these entries from this door to the face were blown both ways. So violent did the destructive elements become in these entries while returning east, that three loaded cars were hurled a distance of one hundred and fifty feet and reduced to atoms, and the coal in neck of No. 1 room, first west, was coked to the depth of one-fourth inch. Coke coal dust was found on all the door framings, cross bars, tool boxes, etc., exposed to the action of the explosion. That this mine was well ventilated is proven by the evidence given at the inquest, and on October 18th, while inspecting this mine, I found 53,025 cubic feet of air in circulation, and the mine in good condition. The engineer, when questioned, stated that to the best of his knowledge the fan was running within a few revolutions of its usual speed when the explosion occurred. That this explosion was the result of an accumulation of light, carburetted hydrogen, or marsh gas, as supposed by many, could not be possible, because this gas has never been detected in this mine, before nor since the explosion. Nor can it be charged entirely to powder, as by reference to appended map of mine it will be seen that the fire wave traveled a distance of three hundred and thirty feet before the first half keg of powder was exploded, and seven hundred and eighty feet to the place where the second bursted keg was found. How much powder it contained is not known, therefore we must admit that something besides powder was a factor in the explosion. The fact that the mine was dry and that the explosion confined itself entirely to the *haulage roads*, and to the return air course, with one exception, is sufficient proof to warrant the belief that *coal dust* played an important part in this disaster, and that it was caused by the flame of

a blown out and overcharged shot fired in No. 2 room, third west entry, heating the fine, dry particles of coal dust set in motion by the shots fired there to an incandescent state, so that the gases contained were liberated and became inflamed. Consequently the following precautionary measures were adopted to prevent a similar explosion in the future:

First—That the mine be kept free from all accumulations of coal dust.

Second—That the roadway be sprinkled with water as often as necessary to keep same in a damp condition.

Third—That fire clay or other incombustible material be used for tamping.

But, notwithstanding the above rules, three miners were badly burned and another injured by a blown out shot fired in No. 9 room, first west north entry, in the intake air course 710 feet from the down cast, on the evening of April 3, 1893.

In order to prevent the firing of shots of this kind, and to compel the miners to be more cautious in locating their holes, General Superintendent S. J. Phillips appointed three practical miners to act as shot inspectors, whose duties are to examine all shots to be fired at each firing time, and to condemn and not allow to be fired any shot they may deem dangerous.

On July 17, 1893, while inspecting this mine, I was informed by Mr. Parker, pit boss, that not less than ten shots had been condemned by the inspectors since their appointment, which, if fired under favorable circumstances, might have resulted in an explosion.

The following analysis of a sample of Pekay coal and powder used there I had made by the St. Louis Sampling and Testing Works.

The analysis of powder I had made at the suggestion of some of the miners who thought that the powder differed materially from ordinary blasting powder.

ST. LOUIS, MO., June 3, 1893.

J. W. CANTY, *Oskaloosa, Iowa*:

DEAR SIR—We enclose herewith certificates of analysis of the samples of black powder and coal submitted to us. The powder is shown by the analysis to be about the average quality of blasting powder known as soda powders instead of saltpetre powders.

The soda powders are very commonly used as ordinary blasting powders and are inferior to the saltpetre powders. The sample of powder sent us seems to have about the usual composition and properties of the soda powders in the market.

The sample of coal is of fair quality only, the per cent of moisture being high. The per cent of ash is somewhat high and the fixed carbon rather low as compared with the volatile matter.

Yours truly,

ST. LOUIS SAMPLING WORKS,
W. B. POTTER, *Manager.*

The sample of coal submitted to us for examination contains:

Moisture	10.78 per cent.
Volatile matter	36.78 per cent.
Fixed carbon	43.44 per cent.
Ash	9.00 per cent.
	100.00

The sample of powder submitted to us for examination contains:

Moisture	1.54 per cent.
Nitrate of soda	72.66 per cent.
Sulphur	10.92 per cent.
Carbon	13.82 per cent.
Ash	1.10 per cent.
	100.04 per cent.

W. B. POTTER, *Manager.*

St. Louis, June 3, 1893.

That the anthracite coal regions have been free from such disastrous mine explosions as have occurred in the various bituminous fields, is not due to a less quantity of gas in the mine, but it is probably due to the fact that anthracite coal is very low in volatile hydrocarbons, and in no instance contains over six per cent. When an explosion occurs in an anthracite mine its effects are only felt as far as the expansion of the gases exploded reaches, and it is therefore confined to one locality. In dry and dusty bituminous mines the force of the explosion is often felt through a large portion of, if not all the workings, and this naturally is corroborative evidence of the explosive nature of dust.

That coal dust in an atmosphere containing an amount of gas so small as to be unnoticeable with the ordinary safety lamp, is inflammable and a great source of danger, is a fact now recognized by all leading mining authorities. That coal dust in an atmosphere entirely free from gas is a dangerous element in the mines, is held by a majority of the mining authorities of the world, and as practical experiments have in many instances demonstrated this fact, it is evident that to secure safety in bituminous and sem-bituminous mines efforts must be made to eliminate this element of danger. Rational provisions to deal with this subject should be incorporated in our mining laws, and the subject should receive fully as much attention as fire damp from all commissions formed to revise old or draft new laws.

The bulk of evidence presented on this subject shows that the dust of coals containing over ten per cent of hydrocarbons becomes dangerous under the following circumstances.

First—The existence of certain quantity of dust.

Second—The dust being set in motion raises in clouds.

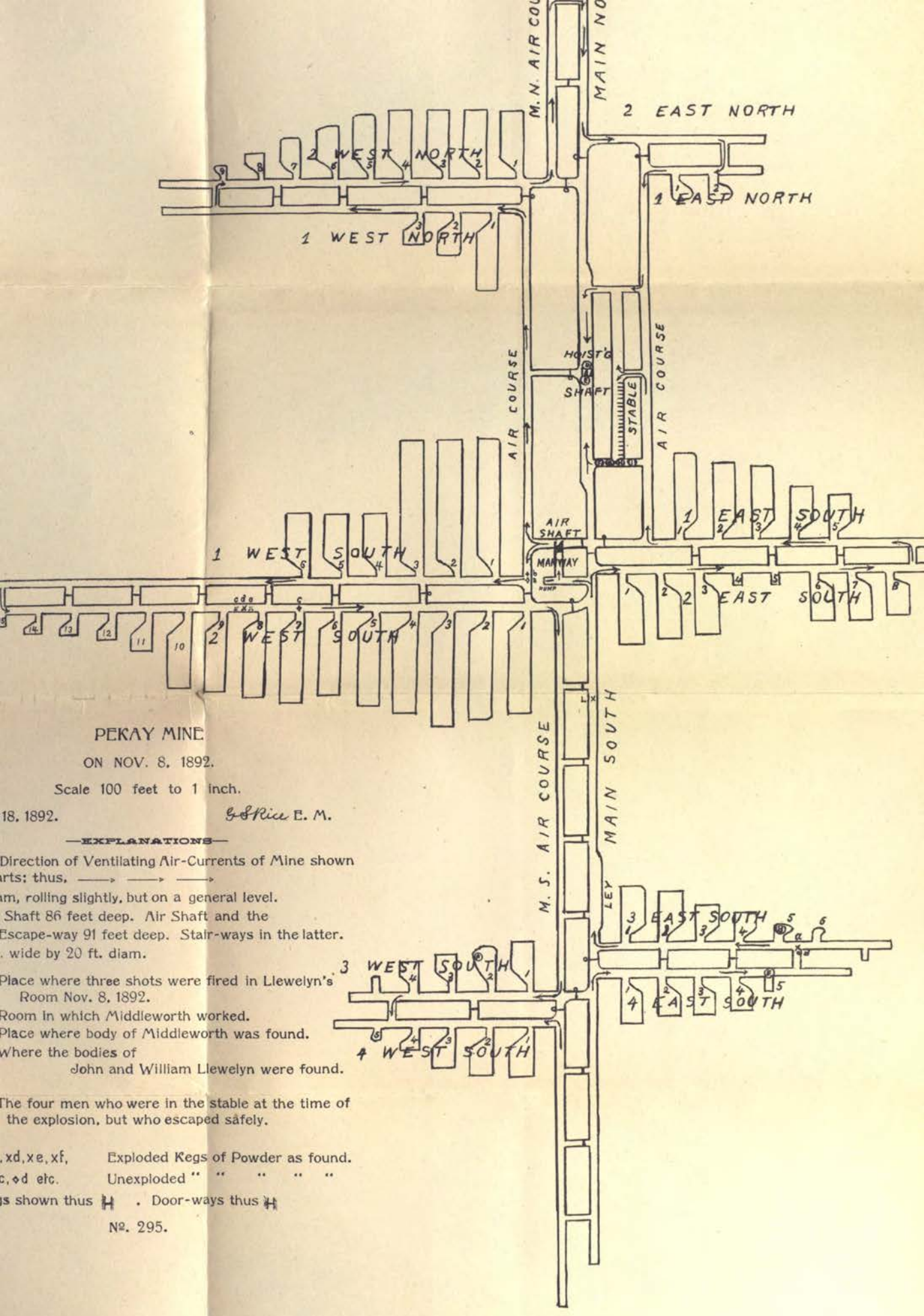
Third—A flame of sufficient intensity to heat the dust so that the gases which it contains are given off and become inflamed.

The first conditions exist in the majority of coal mines that are comparatively dry, but the two latter are only produced either during the process of blasting with gun-powder or in the event of an ordinary explosion of fire damp. Naturally the co-existence of fire damp and coal dust renders the danger more imminent.—*Colliery Engineer, July, 1891.*

Three cases are on record where explosions of coal dust have occurred from naked lights in the entire absence of fire damp. The first explosion took place on the screens at the Seoham Colliery, England, July 19, 1878, by which two men were burned. The second occurred on the 19th of April, 1880, at the Murton Colliery, and one man was seriously burnt.

The third and most serious explosion of the kind took place in a coal box at the Bracepeth Pit, County Durham, England, on the morning of the 24th of April, 1889, by which three men lost their lives. See questions 43, 1532, 1533 of the report of the Royal Commission on explosions from coal dust in mines.

In conclusion I would say that in addition to sprinkling the roadway and keeping the mine free from accumulations of coal dust, etc., I would recommend that the use of fuse in our mines be discontinued and that shot firers be employed to light and fire the shots.



PEKAY MINE

ON NOV. 8. 1892.

Scale 100 feet to 1 inch.

18. 1892. G. S. Rice E. M.

—EXPLANATIONS—

Direction of Ventilating Air-Currents of Mine shown
arts: thus, ——› ——› ——›

am, rolling slightly, but on a general level.
Shaft 86 feet deep. Air Shaft and the
Escape-way 91 feet deep. Stair-ways in the latter.
. wide by 20 ft. diam.

Place where three shots were fired in Llewelyn's
Room Nov. 8. 1892.
Room in which Middleworth worked.
Place where body of Middleworth was found.
Where the bodies of
John and William Llewelyn were found.

The four men who were in the stable at the time of
the explosion, but who escaped safely.

, xd, xe, xf, Exploded Kegs of Powder as found.
c, ◇d etc. Unexploded " " " " "

gs shown thus ⊣H . Door-ways thus ⊣H

№. 295.

PLAN OF PART OF PEKAY MINE
IN VICINITY OF MIDDLEWORTH'S ROOM
ON NOV. 8, 1892, AFTER THE EXPLOSION.

Explanatory

A. Shot that Middleworth fired in his Room just before the explosion.
B. Middleworth's Tool and Powder Box.
C. A Tool and Powder Box as found after explosion, burst open by powder exploding within.
D. Position said box before explosion.
E. Powder Keg burst open by contents exploding.
F. Powder Keg half full of Powder, Paper Cork burnt close.
G. Tool Box undisturbed.
H. Tool Box found in middle entry.
I. Position said Box before explosion.
M. Where the body of Charles Middleworth was found.

Direction of Normal Ventilating Air-Current Shown by Darts.

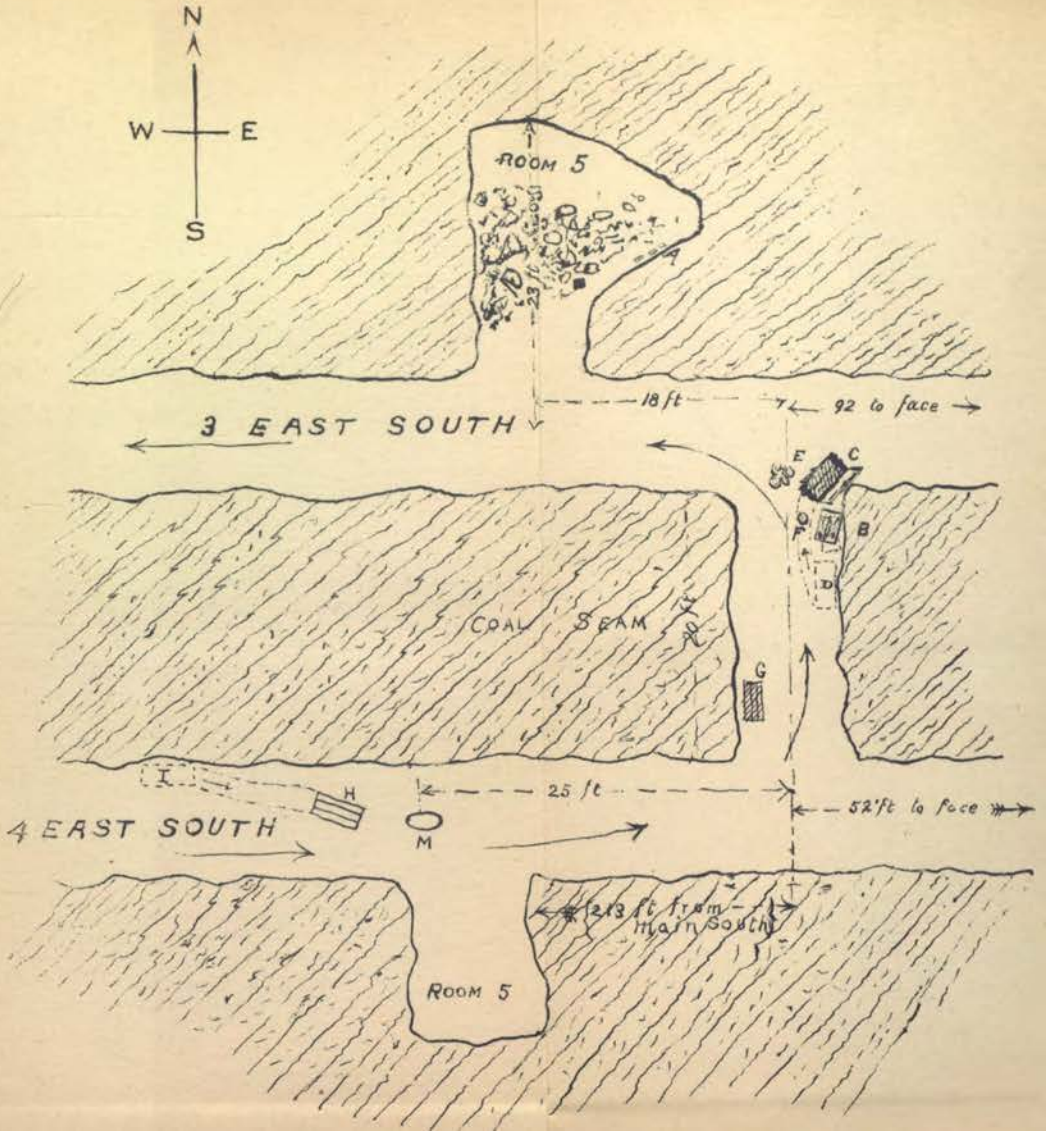
Scale 10 ft. to 1 inch.

Nov. 28, 1892. G. S. Rice E. M., Del.

N. B. Map made from notes taken on morning of Nov. 9 by G. S. Rice, and on Nov. 14 by John Canty, Iowa State Mine Inspector, and G. S. Rice.

N. B. The Location of the boxes before the explosion, as marked hereon, ascertained from the men who worked thereabouts.

No. 297.



BIENNIAL REPORT

OF THE

THIRD DISTRICT,

EMBRACING

ADAIR, BOONE, DALLAS, GREENE, GUTHRIE, MARION, POLK AND WEBSTER COUNTIES.

MORGAN G. THOMAS, INSPECTOR.

To the Hon. HORACE BOIES, *Governor of Iowa:*

In compliance with the law, I have the honor of presenting herewith my biennial report of the Third District on Mines and Mining, ending June 30, 1893.

In submitting to you this, my second biennial report, I have endeavored to condense and be as concise as possible, and have aimed to incorporate nothing but that which I deemed would be of interest to the mining industry and the public in general.

There are one hundred and six mines in this district. My visits to them have been as frequent as necessity demanded. I have given special attention to the ventilation, sanitary, and safety condition of the mines. I am pleased to state that I have met with courtesy from miners and operators, and have had their hearty co-operation in nearly every instance in the furtherance of my duties as inspector. Recognizing the fact that without their co-operation it would be a very disagreeable and arduous task to enforce compliance by litigation, consequently I gladly acknowledge my grateful thanks to all those who rendered assistance.

The report contains tables showing the number of fatal and non fatal accidents, cause and character of casualties. There were twelve fatal and seventeen non-fatal, making a total of twenty-nine, or twenty less than was reported for the previous biennial period, and none of these twenty-nine accidents, as reported to this office, seemed to be avoidable by anyone, except it be the miner himself, as I feel justified in saying that it was not for the lack of proper attention in regard to the safety of the mines or negligence on the part of the operator. It can only be accounted for by the undeniable fact that many miners, after working in the mines for any length of time, become careless and reckless as to their own safety. They take too many dangerous risks, and thereby jeopardize life and limb, and the result is a fatal or non-fatal accident to report.

I have also compiled and tabulated statistical tables showing the number of tons of coal produced annually, the average price per ton for mining, the average selling price per ton, total value of product at

the mines, total amount paid the miner and the laborer, amount of capital invested, number of miners and laborers employed, etc.

These statistics have been collected at this office in the past two years by sending out blanks to each operator or superintendent in the district annually.

In most cases they have been filled out properly and returned. Those that were not answered were principally small country mines. The knowledge I have by frequent visits to these small mines and by reference to the records kept in this office of all miners moving about, the number of men they employ, I think my estimate on their production is not far from right.

So that our statistical tables are as near correct as it is possible to make them. With a short history of each mine, and their condition, also of each coal county, and with suggestions and recommendations that I have made, I believe if given proper thought and put into practical use would be valuable to the mining industry.

Respectfully submitted,

MORGAN G. THOMAS,
Mine Inspector, Third District.

THIRD DISTRICT.

The territory that comprises this district includes thirty-five counties, north and west of Polk county, the east and south line takes in Marion county, that lies southeast of Polk, in all thirty-six counties. But there are only eight of these counties, as yet, that have opened up mines of any importance, namely: Adair, Boone, Dallas, Guthrie, Greene, Marion, Polk and Webster. All of these have been coal-producing counties for the last fifteen years, with the exception of Adair county, where coal was discovered about one year ago and a mine opened there.

There seems to be a healthy feeling in the mining industry, and it is gradually growing in this district. Mines are becoming better equipped and more modern in their improvements; so that I think that the management of our mines will compare favorably with those of other states.

I believe that the time is not far distant when other counties of this district will discover coal in paying quantities. All that it needs to do this is to get capital and labor interested in the matter, and with the energy and push characteristic of the Iowa people, I don't see any good reason why there should not be splendid coal fields opened up in some of the counties at least, where they now have to purchase their coal from other markets of the State.

The eight counties that are producing in this district have one hundred and six mines that are subject to the mining law; and all of them are kept in fair condition in regard to safety, sanitary and ventilation.

There are about twenty-three hundred men and boys employed in and around these mines, and all seem to get along nicely, and are well satisfied. No strikes of any importance during the last two years.

They have an annual output of over one million tons of good merchantable coal that has a ready sale as fast as produced.

Of course these mines vary in their capacity of production. They run all the way from twenty tons up to four hundred tons per day, and employ from ten to two hundred and twenty-five men to the mine, according to the capacity of the "plant."

I have no doubt that the capacity will be increased in these counties in the next two years, as the trade has been such in the last season that in my opinion will have a very encouraging and stimulating effect with both miners and operators to enlarge the capacity of the present mines, and an inducement to open up new ones

COAL OUTPUT OF COUNTIES COMPRISING DISTRICT No. 3 FOR THE PAST FIVE YEARS IN TONS.

COUNTY.	1889.	1890.	1891.	1892.	1893.
Adair					2,000
Boone	124,615	132,584	189,577	202,507	185,916
Dallas	69,430	42,698	43,324	31,841	35,188
Greene	94,415	74,135	74,544	29,012	49,543
Guthrie	13,412	8,939	11,966	12,042	14,000
Marion	140,594	170,183	210,061	219,414	234,528
Polk	356,039	508,149	397,833	371,389	466,408
Webster	145,653	130,099	124,093	104,679	145,274
Total	944,158	1,066,787	1,051,396	970,884	1,132,857

TABLE No. I.

Showing number of mines, annual output, number of miners employed, value of product, capital invested, etc., in District No. 3, for the year ending June 30, 1892.

NAME OF COUNTY.	Number of mines.	Amount of capital invested.	Number of tons of coal produced.	Average price per ton for mining.	Number of miners employed.	Number of all other employes.	Total amount paid miners.	Total amount paid all other employes.	Total value of product at mines.	Average selling price per ton at mine.	Expense of tracklaying, props, etc., at mines.
Boone	21	$ 171,500	202,507	$ .90	403	158	$231,570.80	$ 69,435.79	$ 300,858.51	$ 1.93	$ 8,653.80
Dallas	6	61,850	31,841	.88	84	35	28,395.51	10,675.63	51,967.55	1.61	1,900.50
Greene	5	21,900	29,012	.80	54	19	23,300.00	7,231.20	47,283 00	1.63	2,778 45
Guthrie	13	10,000	12,042	1.50	70	15	18,063.00	2,500.00	30,105.00	2.50	800.00
Marion	24	209,700	219,414	.75	344	120	164,629.80	65,708.08	279,753.38	1.30	9,071.00
Polk	20	445,000	371,389	.93	630	253	345,392.40	107,284.08	579,396.84	1.56	16,191.41
Webster	17	364,550	104,679	.93	241	70	97,451.47	33,019.39	172,985.86	1.60	7,780.12
Total	107	$1,284,600	970,884	$ .90	1,892	680	$878,613.98	$269,915 00	$1,522,400.08	$ 1.56	$47,055.37

TABLE No. II.

Showing number of mines, annual output, number of miners employed, value of product, capital invested, etc., in District No. 3 for the year ending June 30, 1893.

NAME OF COUNTY	Number of mines.	Amount of capital invested.	Number of tons of coal produced.	Average price per ton for mining.	Number of miners employed.	Number of all other employes.	Total amount paid miners.	Total amount paid all other employes.	Total value of product at mines.	Average selling price per ton at mine.	Expense of tracklaying, props, etc., at mines.
Adair	1	$ 10,000	2,000	$1.00	8	4	$ 2,000.00	$ 1,000.00	$ 5,000.00	$ 2.50	$ 3,000.00
Boone	18	183,000	185,916	.90	400	121	183,738.75	48,890.00	279,051.25	2.04	13,000.00
Dallas	8	93,000	35,188	.93	85	34	33,690.54	16,388.63	64,188.80	1.78	2,000.00
Greene	4	85,000	49,543	.90	106	37	45,880.00	27,677.67	82,719.65	1.67	3,500.00
Guthrie	16	11,500	14,000	1.25	70	16	15,250.00	2,800.00	35,000.00	2.50	12,000.00
Marion	23	270,000	233,528	.75	343	114	174,955.94	38,855.00	314,319.50	1.33	11,800.00
Polk	23	455,000	465,408	.98	656	268	456,379.84	138,941.55	785,440.70	1.69	30,000.00
Webster	17	280,100	145,274	.97	258	87	140,915.17	24,925.48	258,760.30	1.80	14,020.00
Total	111	$1,385,600	1,132,857	$ .93	1,926	683	$1,052,850.24	$299,908.33	$1,925,519.20	$ 1.70	$88,520.00

TABLE No. III.

Showing average number of mines in operation, output of coal, average number of miners and other employes, compensation, value of product, etc., in District No. 3, for the biennial period ending June 30, 1893.

NAME OF COUNTY	Average number of mines.	Average amount of capital invested.	Number of tons of coal produced.	Average price per ton for mining.	Average number of miners employed.	Average number of other employes.	Total amount paid miners.	Total amount paid all other employes.	Total value of product at mines.	Average selling price per ton at mine.	Expense of tracklaying, props, etc., at mines.
Adair	1	$ 10,000	2,000	$1.00	8	4	$ 2,000.00	$ 1,500.00	$ 5,000.00	$ 2.50	$ 3,000 00
Boone	17	177,750	388,423	.90	435	139	385,242.55	118,325.79	709,889.76	1.90	21,633.80
Dallas	7	77,425	68,329	.90	85	35	61,894.05	27,964.26	116,156.35	1.70	3,900.50
Greene	4	43,000	78,505	.85	80	29	69,180.00	34,838.87	130,007.65	1.65	6,278 45
Guthrie	15	10,750	26,042	1.38	70	16	33,353.00	5,300.00	65,105.00	2.50	2,000.00
Marion	23	274,350	452,942	.75	344	122	339,585.74	103,625.08	593,873.08	1.32	20,871.00
Polk	21	450,500	837,797	.96	643	270	801,772.24	246,226.50	1,365,807.54	1.63	36,191.41
Webster	17	296,825	249,953	.95	249	79	238,366.64	57,044.87	431,785.16	1.70	21,750.00
Total	106	$1,335,100	2,103,741	$ .92	2,014	694	$1,931,464.22	$593,823.33	$3,477,949.28	$ 1.65	$115,575.37

NOTE.—The above tables do not contain the salaries of superintendents, mine-foremen, or other officials of the mines: neither do they contain the royalty that the different coal companies pay on coal, which is from eight to eighteen cents per ton.

ADAIR COUNTY.

Coal was discovered in the above county in 1892, by the late L. R. Carrens, who sunk a shaft 240 feet deep to the first vein, which is 3 feet thick, but claimed that he had drilled through a second vein 40 feet deeper, which was 4 feet thick. The seam of coal that is being worked is of good quality, and the roof is excellent, and can be worked successfully by the long wall system of mining coal.

The probability is that coal underlies a large portion of this county, but at a greater depth than any that has been mined heretofore in the State, as the drift deposit in the central part of this county is nearly 200 feet deep. The mine is located six miles south of Adair station on the Chicago, Rock Island & Pacific railroad.

BOONE COUNTY.

This county has about 20 mines and produces annually about 200,000 tons of coal, and gives employment to 500 men. Twelve of these mines are shipping mines on the Chicago & Northwestern railroad, near Boonsboro. The others are local mines, near Moingona, Pilot Mound, Zenorsville and Madrid. The coal in this county runs from 3 to 5 feet in thickness, and of the very best quality in the State. Eighteen of these are shaft mines from 35 to 244 feet deep; 1 slope, and 1 drift. Two seams of coal are being extensively worked in this county.

On the east side the coal is about on a level with the Des Moines river, but in order that the coal may be brought to the surface where it could be loaded into the railroad cars without hauling in wagons, shafts have been sunk from the top of the bluffs, as it is less expense to the operator in placing the product on the cars by steam power than it would be in hauling it up grade with horse power.

The most prominent of the shipping mines are the D. W. Johnson, Milford; Rogers & Crow, Clyde; John Marshall & Son, and McBirnie & Nelson mines, all located near Boonsboro, on Chicago & North Western railway.

These mines employ from thirty to one hundred and fifty men to the mine. They work in fall and winter to their full capacity, and have a ready market for all they can produce at a good price, as they have some advantages over many other counties by being further to the north and west where the demand is greater than the supply.

In the eastern part of the county there are some local mines. The two that are producing the largest amount of coal are Hutchinson Bros. & Son, and the Joseph York mines. These are splendid local mines, located near Zenorsville on Squaw creek, a tributary to the Skunk. They employ from twenty to thirty men each and do an extensive local trade, as they are several miles from the railroad. Both are shaft mines about 80 feet deep. Coal 4 feet deep and of a good quality.

Near Pilot Mound, are two good mines in operation, one owned by James Wilson, the other by Yunkle Brothers. They are worked principally for winter trade; they are shaft mines, one 50 and the other 85 feet deep; coal 4 feet thick; they employ from 10 to 20 men each during the winter months, as their product is all sold at local sales for domestic purposes.

Besides the mines already mentioned, there are several other local mines located in different parts of the county, some at Madrid, Moingona and Boonsboro, all of them doing a good local trade during the the fall and winter months.

Taking the past history of the coal in Boone county, and from experience and personal observations in the last three years, I have no doubt but that there are many undeveloped coal fields in this county that will be a great source of revenue to its citizens and the State in the near future.

BOONE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
W. D. Johnson Coal and Mining Co	W. D. Morgan	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping.
Milford Coal and Mining Co	John Keaton	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping.
Rogers & Crow Coal Mining Co	William Crow	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping.
Clyde Coal and Mining Co	O. M. Carpenter	Boone	Shaft	Longwall	Fan	Steam	Shipping.
John Marshall & Son	John Marshall	Boonsboro	Shaft	Room and pillar	Furnace	Steam	Shipping.
Sherrill Mine	Sam Sherrill	Boonsboro	Shaft	Longwall	Furnace	Steam	Shipping.
Garden Hill Coal Co	Heagy Bros.	Boonsboro	Shaft	Longwall	Fan	Steam	Shipping.
John E. Johnson & Co	John E. Johnson	Mologousa	Shaft	Longwall	Furnace	Steam	Shipping.
White Smoke Coal Co		Mologousa	Shaft	Longwall	Furnace	Steam	Shipping.
W. D. Morgan Mine	W. D. Morgan	Boonsboro	Shaft	Longwall	Furnace	Horse	Local.
John Wilson Mine	John Wilson	Pilot Mound	Shaft	Room and pillar	Furnace	Horse	Local.
Yunkel Bros. Mine	Yunkel Bros	Pilot Mound	Shaft	Room and pillar	Furnace	Horse	Local.
Hutchinson Bros. & Son Mine	John Hutchinson	Zearsville	Shaft	Room and pillar	Furnace	Horse	Shipping.
Joseph Yark Mine	Hugh Given	Zearsville	Shaft	Longwall	Furnace	Horse	Shipping.
Boone Coal Co	James Wier	Boonsboro	Shaft	Longwall	Furnace	Horse	Shipping.
Highland Chief Mine	James Pearce	Boonsboro	Slope	Longwall	Furnace	Horse	Local.
Hall & Hunt Mine	Hall & Hunt	Boonsboro	Slope	Longwall	Furnace	Horse	Shipping.
John Caswell Mine	John Caswell	Mologousa	Shaft	Longwall	Furnace	Horse	Local.
James Buckley & Son	James Buckley	Boonsboro	Shaft	Longwall	Furnace	Horse	Local.
R. Porter Mine	Enoch Porter	Madrid	Drift	Longwall	Furnace	Horse	Local.
Robert Porter Mine	Robert Porter	Madrid	Drift	Longwall	Furnace	Horse	Local.

DALLAS COUNTY.

Has but two shipping mines, one at Dawson, on the Chicago, Milwaukee & St. Paul railroad, owned by the Dawson Coal and Mining Co. This mine has been idle for the past year, but the company have, in the last three months, overhauled it, and are now taking out coal, and the prospects for the future are that they will do quite an extensive business.

The Van Meter is another very good shipping mine, located near Van Meter, on the Chicago, Rock Island & Pacific railroad. At this place they have large brick and tile works; the raw material being taken from the mine as the coal is mined, and is of a very superior quality.

There are several small mines near Redfield, Linden, and Chestnut Ford, being operated during the winter months for the local trade.

There are seven mines in this county, three shafts and four drifts, that have produced annually about forty-five thousand tons of coal, and employ about one hundred men. The coal seam in this county is from two and one-half feet to four and one-half feet in thickness, and is found from forty to two hundred and sixty feet below the surface. The county will not be up to her former output this biennial period, but the prospects are now that she will excel any of her past outputs in the next two years.

DALLAS COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POST-OFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Dawson Coal and Mining Co.	Joseph Rumsey	Perry	Shaft	Room and pillar	Fan	Steam	Shipping.
Van Meter Coal and Mining Co.	Peter White	Van Meter	Shaft	Longwall	Fan	Steam	Shipping.
J. R. Strange & Son	J. R. Strange	Chestnut Ford	Drift	Longwall	Furnace	Horse	Local.
Bodfield & Hutchins	Bodfield & Hutchins	Linden	Drift	Longwall	Furnace	Horse	Local.
O. P. Case	O. P. Case	Bodfield	Drift	Longwall	Furnace	Horse	Local.
Caufield & Botts	Caufield & Botts	Bodfield	Drift	Room and pillar	Furnace	Horse	Local.
James Tudor	James Tudor	Dawson	Drift				

GREENE COUNTY.

Has at this present time but few mines in operation. The most important is owned and operated by the Angus Coal and Mining Company, near Angus. This is a shipping mine that does quite an extensive business over the Chicago, Rock Island & Pacific railroad.

The Rippey mine is a shipping mine. It has changed ownership recently and the prospects are fair that they will operate quite extensively the coming season. The mine is located on the Chicago, Rock Island & Pacific railroad.

The Dalby mine ship a part of their product, and sell the balance to the local trade. This mine has not done much shipping the last season, owing to certain difficulties they had to contend with in operating the mine, but they bid fair to do well the coming season.

There are several other small mines located in different parts of the county that are operated during the winter months for the local trade.

The prospects are that this county will increase her output of coal considerably the coming season.

GREENE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POST-OFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Angus Coal & Mining Co	Joseph Ramsey	Perry	Shaft	Room and pillar	Fan	Steam	Shipping.
Rippey Coal & Mining Co	John Waters	Rippey	Shaft	Room and pillar	Fan	Steam	Shipping.
Dailey Coal Co	John Dailey	Angus	Shaft	Room and pillar	Furnace	Steam	Local.
Michael Feith	Michael Feith	Angus	Shaft	Room and pillar	Furnace	Horse	Local.
Henderson & Throp	Henderson & Throp	Angus	Shaft	Room and pillar	Furnace	Horse	Local.

GUTHRIE COUNTY.

This county has from 15 to 20 local mines in operation during the winter season. The Raccoon river runs diagonally across the county, and the most of the coal is found on this river, commencing at the southeast corner and extending as far to the northwest as Bayard.

These mines are worked principally during the winter months by miners and operators who farm during the summer, as it does not pay to run them only when there is a local demand for their coal for domestic purposes.

They are, as a rule, too far from the railroads to justify shipping. Although I believe the time will come when Guthrie county will produce more coal than needed for home consumption. The coal fields in this county have not been developed to any great extent for the lack of shipping facilities and capital to open up larger works. There is no question in my mind but that there is plenty of coal in this county and of a splendid quality; while it is true that the vein of coal here is not as thick as in some parts of the State, but it runs from 2½ feet to 4 feet thick, and easily mined, and can be handled with a fair profit to the operator.

The mines that are being worked in the county at the present time sell all of their product as fast as they can produce it from $2.50 to $3.00 per ton at the mine, and generally pay 6 cents per bushel for mining.

Ten of these mines are shaft mines, that are from 40 to 126 feet in depth; the balance of them are drifts or slopes. They employ from 5 to 30 men each during the winter, and produce about 15,000 tons annually. This coal is all consumed in the county. The shaft mines all use horse power for hoisting their coal, the drift mines run their coal out by man power. There are 8 of these mines located near Fansler, 4 near Bayard, and 3 near Panora, as the following tables will show. The most prominent among these is the Clipper mine, owned and operated by Aaron Marchant, near Fansler, and the Black Diamond, 3 miles west of Fansler, operated by James Thomas, the Panora mine owned and operated by D. D. Rees, and the Green Brier near Jamaica, owned and operated by W. D. Simon & Son.

The healthy condition of the coal trade in the past year will doubtless be a great inducement to capital and business men generally, to become interested in the coal industry of the county, and open up new mines and develop them to such an extent that they will become a very great source of revenue to themselves, the county, and State.

GUTHRIE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Clipper Mine	A. Marchant	Panora	Shaft	Longwall	Furnace	Horse	Local.
A. Winters Mine	A. Winters	Panora	Shaft	Longwall	Furnace	Horse	Local.
Black Diamond	James Thomas	Panora	Shaft	Longwall	Furnace	Horse	Local.
Minnehaha Mine	Minnehaha	Panora	Shaft	Longwall	Furnace	Horse	Local.
S. S. Briggs Mine	S. S. Briggs	Panora	Shaft	Longwall	Furnace	Horse	Local.
P. Ramslow Mine	P. Ramslow	Panora	Shaft	Longwall	Furnace	Horse	Local.
Hughes Bros	N. Hughes	Panora	Shaft	Longwall	Furnace	Horse	Local.
Panora Block Mine	W. D. Moss	Panora	Shaft	Room and pillar	Furnace	Horse	Local.
Garrett Bros Mine	Garrett Bros	Panora	Shaft	Longwall	Furnace	Horse	Local.
Charles Miller Mine	Chas. Miller	Bayard	Drift	Longwall	Furnace	Horse	Local.
W. P. Williams Mine	W. P. Williams	Bayard	Drift	Longwall	Furnace	Horse	Local.
Isaac Clark Mine	Isaac Clark	Bayard	Drift	Longwall	Furnace	Horse	Local.
Hughes, Hoops & Morris	J. Hughes	Panora	Shaft	Longwall	Furnace	Horse	Local.

MARION COUNTY.

Marion is a county that is surrounded by coal producing counties, and will, when thoroughly developed, be second to no other county in the State as to the quantity and quality of her coal. There is, perhaps, the thickest vein of coal in this county near Marysville along the Cedar Creek, of any other place in the State, running from five to ten feet in thickness and of a splendid quality'

The Des Moines river runs diagonally across the county, and there are many coal mines located on both sides of the river from east to west. There are also three railroads running through the county, the Chicago, Rock Island & Pacific, Chicago, Burlington & Quincy and Wabash, which gives the several mines near them good shipping facilities.

There are from twenty-five to thirty mines being worked in this county, and they produce 250,000 tons annually, and give employment to almost 400 miners. A great many of these mines are worked through the winter season simply for the local trade, employing from 5 to 20 men to each mine, while there are others that are located on the railroads that do a good shipping business both winter and summer, giving work to from 25 to 100 men, to the mine. Among the largest of these are the Black Swan, at Swan; Black Diamond, at Dunreath; Midland Coal and Mining Company, at Morgan Valley; Oak Hill, at Flaglers; and the Otley mine operated by the Marion Coal and Mining Company, near Otley, on the Chicago, Rock Island & Pacific railroad. These are probably the largest mines in the county that do an almost exclusive shipping business. Of course there are several other good mines that are producing large quantities of good coal, but their trade is divided between local and shipping. The most conspicious among these are: Boudinot and Davis mines at Hamilton, Powers mine at Bussey, Gamble, Lewis, Robinson and Collins at Knoxville, and the Swan mine at Swan.

The majority, probably two-thirds, of the mines in this county are slopes or drifts. The balance are shaft mines from thirty-five to ninety feet deep. Several new mines have been opened up during the past year, and the indications are that Marion county will largely increase her output in the next two years. I am satisfied that they have the coal, and all that is necessary to produce it is for capital and labor to take hold, and there is no doubt but that Marion county can be placed in the front ranks as a coal producing county of Iowa.

MARION COUNTY.

NAME OF COMPANY, FIRM, OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Hisek Diamond Coal Co	Wm. Robinson	Donnellson	Slope	Room and pillar	Fan	Steam	Shipping.
Midland Coal and Mining Co	Robert Hall	Morgan Valley	Shaft	Room and pillar	Fan	Steam	Shipping.
Bluff Creek Coal and Mining Co	Richard Beeler	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Otley Coal and Mining Co	Thomas Proctor	Otley	Slope	Room and pillar	Fan	Steam	Shipping.
Oak Hill Mine	Samuel Bollins	Flagler	Slope	Room and pillar	Furnace	Horse	Shipping.
J. A. Bondinot Mine	J. A. Bondinot	Hamilton	Slope	Room and pillar	Furnace	Horse	Shipping.
Geo. C. Davis Mine	Geo. C. Davis	Hamilton	Shaft	Room and pillar	Furnace	Horse	Shipping.
Wm. Lewis Mine	William Lewis	Knoxville	Shaft	Room and pillar	Furnace	Horse	Shipping.
Wm. Gamble Mine	William Gamble	Knoxville	Slope	Room and pillar	Furnace	Horse	Local.
Collins & Co	Collins & Co	Knoxville	Slope	Room and pillar	Furnace	Horse	Local.
W. O. Robinson Mine	W. O. Robinson	Knoxville	Slope	Room and pillar	Furnace	Horse	Shipping.
Bussey Mine	J. J. Powers	Bussey	Slope	Room and pillar	Furnace	Horse	Shipping.
Rees Mine	Rees Jones	Pleasantville	Shaft	Room and pillar	Furnace	Horse	Local.
John Youser Mine	John Youser	Marysville	Slope	Room and pillar	Furnace	Horse	Local.
David Fry Mine	David Fry	Marysville	Slope	Room and pillar	Furnace	Horse	Local.
Crawford & Miller Mine	Crawford & Miller	Otley	Slope	Room and pillar	Furnace	Horse	Local.
Patrick Casey Mine	Patrick Casey	Pella	Slope	Room and pillar	Furnace	Horse	Local.
Pella Stock Coal Mine	Lewis Woodyard	Pella	Slope	Room and pillar	Furnace	Horse	Local.
Wm. Franklin Mine	Wm. Franklin	Pella	Slope	Room and pillar	Furnace	Horse	Local.
J. M. Markham Mine	J. M. Markham	Pella	Shaft	Room and pillar	Furnace	Horse	Local.
Hugh McNish Mine	Hugh McNish	Monroe	Slope	Room and pillar	Furnace	Horse	Local.
Lewis Whittatch	Lewis Whittatch	Attica	Drift	Room and pillar	Furnace	Horse	Local.

POLK COUNTY COAL.

The question has been asked us quite often whether the coal fields of Polk county were not almost exhausted, especially in and around the city of Des Moines. This being the capital of the State and one of the largest and most prosperous cities in Iowa, it is but natural that the business men, manufacturers and people generally should feel somewhat anxious and interested in regard to the future fuel prospects of this county. It has been said by a few who had no practical knowledge whatever of the matter that it was only a question of a few years until Des Moines would have to purchase her coal in markets outside of Polk county. I feel justified in saying that such assertions are not founded on any substantial or reliable information.

To those who are conversant with the coal interest of the State it is a well known fact that our principal coal fields lie within a radius of about twelve or fifteen miles on either side of the Des Moines river, extending southeast as far as Lee county, and to the north and west as far as Humboldt county, so you see that Polk county is nearly centrally located in this vast coal field.

The Des Moines river running diagonally across the county and with several mines in operation on each side of the river, it seems to me is substantial evidence within itself that a very large area of Polk county is underlaid with good workable beds of coal.

I have been acquainted with the mines of this county for the last five years and also have a pretty thorough knowledge of what prospecting has been done in the county and of the results, and I feel confident in stating that the coal resources of the county are only commencing to be developed.

The knowledge I have obtained through the mines that are being operated and the prospecting that has been done and from my own personal observations generally, I believe that Polk county has at least 123,000 acres of workable coal that will average 4 feet in thickness. Of course I don't pretend to say that every acre of the 123,000 has coal underlying it, neither do I think that every acre of the coal is 4 feet thick, but I do believe there is coal enough under the 123,000 acres from 2½ feet to 7 feet thick (counting both the upper and lower

veins) to make an average of 4 feet of good workable coal. Allowing this to be true and figuring from a basis of 4,000 tons per acre of 4-foot coal, which is a low estimate, I find that there would be 492,000,000 tons of good, merchantable coal underlying Polk county. There is at the present time 23 mines in operation in the county with an output of about 350,000 tons of coal annually. About 163,000 tons of this is shipped to markets outside of the county, which would leave 187,000 tons of Polk county coal that is consumed at home; then add to this about 8,000 tons that are shipped to the city from outside markets and we have the total amount of coal consumed in the city and county, which is 195,000 tons. At the rate that coal is being mined or produced in this county at the present time (annually 350,000 tons) it would take 1,405 years to exhaust the coal beds of Polk county. And there would be enough coal to last Des Moines at the rate she consumes coal now 2,523 years. It would take 20,000 miners 41 years to mine it, and would require 24,600,000 "flats" or cars to move it. Made up into trains of 20 cars each you would have 1,230,000 trains. This product if sold for $1.75 per ton would bring $861,000,000.

In looking at this matter from a practical knowledge and a close personal observation I have no hesitancy in saying that the future fuel prospects of Polk county are all that the city of Des Moines could wish, to make it a prosperous and manufacturing city. And we should go ahead and encourage the manufacture of brick, tile, glass and all other great industries that can be produced from our own natural resources, of which we have an inexhaustible supply. So that it would stimulate and encourage capital and labor to develop our coal fields and consume the total output at home instead of depending on outside markets to purchase our product.

POLK COUNTY.

Polk county has, at the present time, twenty-three mines in operation. It produces more coal than any other county in this district, and is probably destined to be one of the greatest coal producing counties in the State, as it is nearly centrally located in the present coal field of Iowa.

This county produces biennially nearly one million tons of coal and gives employment to seven hundred men in and around the mines.

Eighteen of these mines are shaft mines from 50 to 250 feet in depth, the other five are slopes or drift mines. All are worked on the room and pillar plan except one, the Polk City mine, which is worked on the long wall system.

Twenty of them are shipping mines, the other four are exclusively local. Eighteen of them use steam power for hoisting purposes, the others use horse power. All but two use mules for hauling the coal to the bottom of the shaft. The J. M. Christy and the Eureka Coal companies have the tail rope system in use in their mines and haul all of their coal to the bottom of the shaft by steam power.

The coal in this county runs from 3 to 6 feet in thickness, and is of good quality.

The mines are all located within a radius of a few miles of the Des Moines river.

About two-thirds of the product of the mines of the county is sold in the city of Des Moines, the balance is shipped to markets north and west. Fifteen of these mines are located within five miles of Des Moines.

Bloomfield, Coon Valley, Des Moines No. 1, Van Ginkel and Proctor are all south of the Coon river, and within two miles of the city, where the bulk of their coal is sold.

The J. M. Christy, Carbondale and Gibson mines are located on the Chicago, Rock Island & Pacific railroad east of the city. The Christy and Carbondale mines are about four miles from the city, while the Gibson mine is only about two and a half miles.

Des Moines No. 2 is located 4 miles north of the city on the Chicago & Northwestern railroad. Oak Park, and the Ramsey mines are local mines located about 2 miles northwest near the Des Moines river.

The Campfield mine is located near the east city on the Chicago & Northwestern railroad.

The Maple Grove and Union mines are located 1 mile north of the State fair grounds on the Diagonal railroad.

The Acme, Logan and the Runnells mines are located at Runnells on the Wabash railroad. The Quinn mine is located 1 mile east of Hastie on the Wabash railroad. All of these sell part of their coal locally, the balance is shipped to the Des Moines market.

The majority of these mines are operated the year round, and find ready markets for every ton of coal that is produced.

POLK COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Bloomfield Coal and Mining Co.	Chas. Worth	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
J. M. Thrasher Coal and Mining Co.	Jas. Thrasher	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Coon Valley Coal and Mining Co.	Thos. Beard	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Des Moines Coal and Mining Co., No. 1	Ed. Turby	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Des Moines Coal and Mining Co., No. 2	Ed. Turby	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Eureka Coal and Mining Co.	Chas. Carlson	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Forest City Coal and Mining Co.	Thos. Hughes	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Campfield Coal and Mining Co.	Henry Garver	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Logan Coal and Mining Co.	J. Stalgreen	Des Moines	Shaft	Room and pillar	Furnace	Horse	Shipping
Maple Grove Coal and Mining Co.	A. Carlson	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Carbondale Coal and Mining Co.	John McKay	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Mineral Coal and Mining Co.	Wm. Hall	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Proctor Coal and Mining Co.	Wm. Edge	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Van Ginkel Coal and Mining Co.	P. Heeney	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping
Polk City Mine		Polk City	Shaft	Longwall	Fan	Steam	Shipping
Rob Mine	R. Dale	Commerce	Shaft	Room and pillar	Fan	Steam	Shipping
Kirk's shaft	Fred Kirk	Des Moines	Shaft	Room and pillar	Furnace	Horse	Local
Rannell's shaft	J. W. Miller	Rannells	Shaft	Room and pillar	Furnace	Horse	Local
Quinn Mine	M. Quinn	Des Moines	Shaft	Room and pillar	Furnace	Horse	Shipping
North Riverside Coal and Mining Co.	Joseph Ramsey	Des Moines	Shaft	Room and pillar	Fan	Steam	Local
Oak Park Coal Mining Co.	C. McClellen	Des Moines	Shaft	Room and pillar	Fan	Steam	Local
Cotton Coal Mining Co	C. Johns	Des Moines	Shaft	Room and pillar	Fan	Steam	Local

WEBSTER COUNTY.

This county is the farthest north of any of the coal producing counties of the State. Its shipping facilities are the equal, if not the best of any other county in the State, as the Chicago & Northwestern and Illinois Central railways are running east and west through the county, and the Chicago, Rock Island & Pacific and the Mason City & Fort Dodge railways are running north and south, which gives the coal trade the advantage of an excellent market to the north and west. Besides these roads there is a short line from Lehigh to Webster City, owned and operated by the Crooked Creek Coal and Railroad company, so that there is nothing lacking as far as exporting their coal is concerned.

The principal seam of coal varies from three feet to six feet in thickness, but the average is about three and one-half feet and of a good quality. The most important of these mines are located at Lehigh, Kalo and Coalville, all near the Des Moines river, which runs across the eastern part of the county.

At or near Lehigh there are nine mines, and all do nearly an exclusive shipping business. The Crooked Creek Coal and Railway company own and operate two mines, one slope and a shaft, and do a very extensive business. The Corey Coal company and the Black Diamond Coal company both do a good shipping business, also G. W. Corey, S. W. Corey, H. A. Corey and A. Smith & Sons, each operating good mines near this place.

At Kalo the Craig Coal and Mining company are the owners and operators of three good mines, two slopes and one shaft, that have a large shipping trade, both winter and summer. Besides these there are four others, E. Johnson, Mills & Edwards, Porter and Howles, that are operating on a somewhat smaller scale, but produce quite a large amount of coal that is shipped principally to merchants outside of the county.

There are four or five mines near Coalville. The most important one is owned and operated by Collins Bros. This mine has quite a shipping trade the year round; the others are local mines operated by O'Neal, Martin, Rhoades and Stine.

There are in all about twenty mines in this county, fifteen slopes, three drifts and two shafts, that employ about 400 men and produce annually 140,000 tons of coal. Seventeen of these are shipping mines, three that have local trade only. Of course the mines that we have mentioned in this report are mines that are subject to the mining laws. There are several other small mines that work from three to five men for the winter trade only. I am of the opinion that Webster county will largely increase her output of coal in the next few years, as the demand and price seem to justify it. I am satisfied that there are good fields of coal undeveloped in this county.

WEBSTER COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POST-OFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	HOW VENTILATED.	Kind of power used.	Shipping or local.
Crooked Creek Coal Co	Samuel McClure	Lehigh	Shaft	Longwall	Furnace	Steam	Shipping.
Crooked Creek Coal Co	Samuel McClure	Lehigh	Shaft	Longwall	Furnace	Steam	Shipping.
Craig Coal Mining Co	Jerry Dawson	Kalo	Slope	Room and pillar	Pan	Steam	Shipping.
Craig Coal Mining Co	Jerry Dawson	Kalo	Slope	Longwall	Furnace	Steam	Shipping.
Corey Coal Co	Rees Stephens	Lehigh	Slope	Longwall	Furnace	Steam	Shipping.
Collins Bros. Coal Co	Collins Bros	Coalville	Slope	Longwall	Furnace	Steam	Shipping.
Collins Bros. Coal Co	Collins Bros	Coalville	Shaft	Room and pillar	Furnace	Steam	Shipping.
G. W. Corey	G. W. Corey	Lehigh	Slope	Longwall	Furnace	Steam	Shipping.
S. W. Corey	S. W. Corey	Lehigh	Slope	Longwall	Furnace	Horse	Shipping.
H. A. Corey	H. A. Corey	Lehigh	Slope	Longwall	Furnace	Horse	Shipping.
A. Smith & Son	A. Smith	Lehigh	Slope	Longwall	Furnace	Horse	Local.
Carlson & Co	Carlson	Kalo	Slope	Longwall	Furnace	Horse	Shipping.
James Martin	James Martin	Coalville	Slope	Longwall	Furnace	Horse	Local.
O'Keefe & Co	James O'Keefe	Coalville	Slope	Longwall	Furnace	Horse	Shipping.
Isaac Rhodes	Isaac Rhodes	Coalville	Slope	Longwall	Furnace	Horse	Shipping.
A. Sim	A. Sim	Coalville	Slope	Longwall	Furnace	Horse	Local.
Parter & Howells	Parter & Howells	Kalo	Slope	Longwall	Natural	Horse	Local.

IMPROVEMENTS MADE IN MINES DURING THE PAST TWO YEARS.

BOONE COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Covers on cages.	Safety catches.	Safety gates.	Brakes on drums.	Fans.	Furnaces.
Clyde Coal and Mining Co	1	1	1	1	1	1	1	1	1
Garden Hill Coal Co									
Samuel McBirnie Mine									
D. W. Johnson Coal Mining Co.							1		
Total	1	1	1	1	1	1	2	1	1

GREENE COUNTY.

Angus Coal and Mining Co	1	1		1	1	1		1	
Total	1	1		1	1	1		1	

MARION COUNTY.

Black Swan Coal and Mining Co	1	1	1	1	1	1		1	1
Black Diamond Coal Co	1								1
Oak Hill Mine	1								
Midland Coal and Mining Co	1								
Bussey Mine	1								
Lear's Mine		1							
Total	5	2	1	1	1	1		1	2

POLK COUNTY.

Carbondale Coal Mining Co	1	1	1	1	1	1		1	
Oak Park Coal Mining Co	1	1	1	1	1	1		1	
Union Coal Mining Co	1	1	1	1	1	1		1	
Des Moines Coal Mining Co. No. 2	1	1	1	1	1	1		1	
Gibson Coal Mining Co	1	1	1	1	1	1		1	
Total	5	4	4	5	5	5		5	

WEBSTER COUNTY.

Crooked Creek Coal Co	1	1							1
Craig Coal Co	1	1							1
H. A. Corey	1	1							
Collins Bros	1	1							1
Total	4	4							3

TABLE

Showing the number and cause of all fatal casualties in District No. 3, for the biennial period ending June 30, 1893.

DATE.	NAME OF DECEASED.	CAUSE OF CASUALTY.	NAME OF COMPANY OR MINE.	WHERE LOCATED.
November 18, 1891	David Davis	Caught by a blast	Angus Coal Co	Angus, Greene county.
November 27, 1891	Grant Ash	Falling rock	Runnels Coal Co	Runnells, Polk county.
February 28, 1892	Joseph Beswick	Falling slate	Des Moines Coal and Mining Co	Des Moines, Polk county
March 10, 1892	A. Schell	Falling slate	W. D. Johnson Coal and M. Co.	Boonsboro, Boone county.
March 26, 1892	Eph. Foster	Falling slate	Garner Coal Co	Des Moines, Polk county
August 29, 1892	Allen Rhythgan	Caught by a blast	J. M. Christy Coal Mining Co.	Des Moines, Polk county.
September 7, 1892	Erick Hoystram	Falling slate	Des Moines Coal Mining Co	Des Moines, Polk county.
November 2, 1892	John Seliers	Falling slate	Milford Coal Co	Milford, Boone county.
November 28, 1892	L. Daniels	Caught by a blast	Manbeck Coal Co	Manbeck, Polk county.
December 1, 1892	John Smith	Falling slate	Green Brier Coal Mine	Jamaica, Guthrie county.
*June 7, 1893	Andrew Petterson	Falling down well	Near Bloomfield Mine	Des Moines, Polk county.
†Novemb'r 17, 1891	Wm. Melander	Boiler explosion	Near Otley Mine	Otley, Marion county.

*The above table shows twelve fatal accidents reported during the biennial period. In my judgment there were but ten of these chargeable to the mining industry. The case of Wm. Melander, an engineer at Otley employed by the Marion Coal Company, was killed by the explosion of a boiler entirely outside of the mine, which occurred about 6 o'clock in the morning, before the mine was in operation for the day.

†Also that of A. Petterson, whose death was caused by falling in a well near the Bloomfield Coal Company's mine, while in the employ of that company as a watchman of the top works.

TABLE

Showing non-fatal casualties of the Third Mining District.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
July 1, 1891	George Fox	Mule driver	Internal	Caught in hoisting apparatus	Des Moines.
May 7, 1891	George Menden	Miner	Rib broken	Fall of slate	Angus.
June 16, 1891	Wm. Hitsman	Miner	Back and hips bruised	Fall of slate	Boonsboro.
November 27, 1891	Erick Olson	Miner	Ankle dislocated	Fell down shaft	Des Moines.
January 14, 1892	W. G. Kneedler	Miner	Head bruised	Fall of coal	Des Moines.
January 22, 1892	Hugh McNish	Miner	Burned badly	Explosion keg powder	Liberty Corner
March 9, 1892	George Simpson	Miner	Leg bruised	Fall of slate	Dunreath.
April 25, 1892	A. Lindbery	Road man	Spine injured and body bruised	Fall of slate	Boonsboro.
April 7, 1892	C. A. Pease	Miner	Bodily injuries	Too near shaft when fired	Des Moines.
March 11, 1892	A. C. Upham	Miner	Both legs broken	Fall of slate	Des Moines.
May 30, 1892	John Larson	Miner	Leg broken	Fall of slate	Des Moines.
September 26, 1892	James Muldoon	Miner	Slightly bruised	Thrown from car	Des Moines.
October 3, 1892	Wm. A. Price	Driver	Hip and legs bruised	Thrown from car	Lehigh.
October 7, 1892	Alex. Berg	Miner	Serious bruises	Caught between car and roof	Runnells.
December 16, 1892	John White	Miner	Broken rib	Fall of slate	Runnells.
December 22, 1892	H. T. Davis	Pit boss	Sprained ankle	Fall of slate	Des Moines.
December 19, 1892	Duncan Elder	Miner	Leg broken	Fall of slate	Des Moines.

FATAL ACCIDENTS.

During the last biennial period there has been ten fatal accidents in the mines of the Third District. Seven were caused by the falling of slate or roof. Three were caused by the use of powder.

Accidents will occur in and around the mines with the best care that can be taken by all concerned in the mining of coal. Therefore it behooves every man and boy that works in and around mines to be on the alert to guard against danger and accidents to himself and fellow workmen. It is my earnest desire to see that time arrive when every workman will exert that care for self preservation which is his duty to himself and family, likewise to his fellow workmen in helping to reduce the accidents which are so numerous in the mining of coal.

The miner's occupation is a very hazardous one, therefore it requires them to be very cautious as they advance with their work as a blast fired may leave a comparative safe place a very dangerous one, so that every hour in the day the inside workings of the mine are changing for the safety or unsafety of the employes therein.

The fall of slate or roof is a common danger that surrounds the miner at all times, and this common danger has more victims than any other. Whether the workmen were more reckless, or this danger greater than previous years, I am not prepared to say. However, I know that several of the victims recorded on this death list, by a little common prudence and care on their own part, might have averted an accident.

In fact, there are several sources of danger connected with mine operations as well as in many other branches of industry that the safety of the workmen, to a very great extent, depends upon themselves. For instance, the constant danger of falls of coal and roof; also handling of explosives, can be only guarded against by the constant care and judgment displayed by the workmen themselves.

The accidents that were caused by blasts are beyond the control of the Inspector or mine foreman, and the remedy must come from the men themselves.

SCALE TESTING.

The laws of 1888, chapter 54, make it obligatory for the Mine Inspector of each mining district to test all scales, beams and other apparatus used in weighing coal as often as occasion may demand.

I have tested fifteen different scales during the past biennial term. The name of mines where scales are located and the date of tests are as follows: Des Moines mine No. 2, December 12th, 1891, and December 14th, 1891; Maple Grove, February 3d, 1892, and February 5th, 1892; Acme, June 7th, 1892; Coon Valley, June 9th, 1892, Manbeck, June 16th, 1892; J. M. Christy, October 7th, 1892; Rippey, November 17th, 1892; Coon Valley, December 5th, 1892; Des Moines No. 2, January 6th, 1893; Eureka, January 16th, 1893; Proctor, March 3d, 1893, and Des Moines No. 2 mine, March 10th, 1893. Eleven sets were found correct on testing and four incorrect, but were, on my instruction, immediately adjusted.

The requests for testing scales came to me from miners who were interested and I have made a special effort to comply immediately with these requests whenever they were sent to this office in writing or told to me verbally.

OFFICE OF STATE MINE INSPECTOR,
District No. 3.
M. G. THOMAS, Inspector.
Des Moines, Iowa, June 28th, 1893.

To the Miners of the State:

By the earnest request of many of you I have had three samples of powder that is most commonly used in the mines of the State analyzed. Namely No. 1, Laflin & Rand's F F. No. 2 and 3, Dupont's F F. and C. Brands, which give the following results.

M. G. THOMAS,
Mine Inspector.

IOWA AGRICULTURAL COLLEGE, *Experiment Station.*
Chemical Section, G. E. PATRICK, *Chemist.*
W. H. HEILMAN, *Assistant.*
Ames, Iowa, May 31st, 1893.

Analysis of three samples blasting powder received from M. G. Thomas, State Mine Inspector. Samples received May 26th.

	Sample Numbers. 1	2	3
Total water—soluble matter	70.86	71.10	71.88
Containing chlorides, calculated as potassium chloride, KCl	.37	1.51	.85
And calcium sulphate (or sulphate of lime) Ca. SO4	.14	.30	.22
Leaving, pure nitre	70.35	69.77	70.83
*Sulphur	11.97	11.04	11.12
*Charcoal and hygroscopic moisture, by difference	17.68	19.19	18.05
	100.00	100.00	100.00
*Sand and ashes left after burning the sulphur and charcoal (i. e. the insoluble portion of the powder)	.51	.77	.71

*The impurities and ash are no more than may be expected in the commercial articles used.

G. E. PATRICK,
Chemist.

RECOMMENDATIONS.

I heartily recommend that a commission be appointed by the Executive Council to revise the present mining laws of the State, the said commission to be comprised of three miners, three operators and the three State Mine Inspectors, and they recommend to the next General Assembly such laws as they deem necessary to meet the present demand of the mining industry of the State.

REMARKS AND SUGGESTIONS.

The growth and rapid increase of the mining industry of Iowa within the last ten years, and the present large number of mining plants in contemplation, makes a few practical remarks relative to the opening and development of such plants of great importance and they will not be out of place in this report.

Having determined upon a prospective coal field, the first question that presents itself to the operater is where to locate his shaft. The amount of money he has to invest will often largely modify his plans in this direction, and compel him to accept a location immediately upon the line of some railroad. Fortunate will he be if such location places his hoisting shaft approximately in the center of his coal field, and affords him ample room about his shaft for the proper arrangement of necessary buildings, storage of material, etc. If the coal field is large the prudent operator will divide it with reference to future openings and development. Much time and money is saved to the operator by a thorough knowledge, as far as possible, of the field he is about to open; the quality of the coal, nature of roof, the probable amount of water with which he will have to contend. This information is readily gained from a thorough prospecting of the land, by means of core drills; and no prudent operator now thinks of entering a new field without first putting himself in possession of these facts. These facts, together with practical experience, will determine the method best adapted for the extraction of this coal. It is essential to economical working that the coal be brought from all directions

toward the hoisting shaft. This would make the typical mine and would undoubtedly largely increase the net earnings of the mine, although our Iowa fields are often so narrow-pocketed or contracted as not to admit of this.

Having decided upon the location of the shaft, the next point of importance that presents itself is the size of the shaft. This is a most important point, and one which in nine cases out of ten is misapprehended. It must be remembered that through this hole must be brought daily the entire output of the mine, and, as a consequence, the size of the shaft may some day prove a serious hindrance to the mine's yielding its full capacity. When a mine cannot be worked to its full capacity the operator is losing money. Again, when the operator is losing money, the interests of the miner is likewise suffering. Make the shaft large enough for the largest expectations; it may cost a little more, it can do no other harm, and may prove a great blessing; and what we say here in reference to the hoistway applies with as much force to the air shaft. Many of our largest mines are embarrassed to-day from this very cause, and, as a consequence, cannot keep their men in the pit regularly, resulting in a serious decrease in tonnage, a loss to both operator and men. The men must live in the mine, it is their workshop; it must be well ventilated and kept free from all filth. It is well to draw attention here to the fact that in the working of a vein of low coal a shaft of larger dimensions will be of advantage because the boxes are necessarily low, long and wide. A careful consideration of these facts beforehand means an increase of net revenue to the operator.

Before beginning to sink have all materials in readiness on the ground. This is very important, as a delay after the work has been started is dangerous and may prove fatal. Lay out the shaft upon ground in the desired location by driving stakes upon line with the sides and ends, but far enough back from the shaft that they will not be disturbed. These stakes should be upon the line of the inside of the curbing. Stretch cords between these stakes and start the excavation, cutting far enough behind the lines to allow for the curbing. Carry the excavation down by pick and shovel through the drift as far as it is deemed safe to go without danger of caving; then square up and clean up; and, starting at the bottom, begin to build up the curbing, taking care to tamp well the earth behind the curbing as it comes up. When within 2 feet of the top, heavy cross-sills should be laid true with the curbing and extending back 5 or 6 feet into the earth; across and over these comes the heavy mud sill of the tower, which likewise extend about 5 feet on each side of the shaft and form the base of the

tower. When these sills are in place and well secured, the work of sinking may be again commenced, a temporary tower or windlass being used. The depth to which the excavation may be carried below the curbing before timbers are again put in will depend upon the character of the soil passed through; always great care must be taken to avoid the sinking of the curbing. When the working seam is reached, the excavation is still continued from 6 to 10 feet below this to provide for the necessary slump. Great care is needed in placing the bottom framing and securing the whole.

The thickness of the curbing is a very important point; while some strata will be practically self-supporting, other soft shales and sand will require a good thickness of curbing; so that we find it necessary to use curbing varying from 3 and 4 to 12 inches, according to the existing conditions; but the great danger lies in using too light a curb, resulting in bulging and twisting of the shaft. When the lower framing has been well secured, drifting from the bottom in the vein is begun at the same time from each side of the shaft, and these drifts are carried in square with the shaft for about 60 yards, before any cross entries are started; at this point cross entries may be started on each side of the main entries and on both sides of the shaft rooms may be turned off of these cross entries, leaving, in ordinary cases in Iowa, a pillar from 20 to 25 feet thick between the main entry and the first room; the rooms should be widened on the inside. The first point to be aimed at in driving is to make connection with the air shaft, and thereby secure a system of ventilation. Until this can be done ventilation must be accomplished by bratticing. The main air course is driven to the main entry on the side nearest the air shaft, leaving an entry pillar for a distance on either side of the shaft of from 20 to 25 feet thick. In some cases it may be better to make these entry pillars 30 feet in the vicinity of the shaft. Stables can be arranged in this pillar, by widening the regular air course at the point where the drift from the bottom of the air shaft strikes it, and diverting the main air current so as to miss the stables. A small leak should be established through the stables into the main return so as to ventilate them without harm to the fresh air passing into the pit.

Very much of the success of mining depends upon the careful arrangement and planning of the underground workings, both with respect to the entire extraction of the coal and the thorough ventilation of the works. The method of extraction by driving headings or entries to the boundaries or limits of the proposed mine, and working out the coal from the outer circle toward the center, allowing the roof to fall in behind, is not adapted to our mines, and is never found here. One of the problems of our mining is the maintenance of the main

roadways until the field they are intended to reach has been exhausted and the stubs can be withdrawn and saved. Much valuable coal has been irretrievably lost by simple neglect or careless methods of mining. Waste of this sort should be criminal. This brings us to consider also undue waste and destruction of coal by the miner in his methods of mining. We find all grades of miners in our pits, as is true with respect to every calling in life; some are tidy and workmanlike, while others are careless, indifferent and shiftless; their respective methods are like themselves. The one class will apply themselves to the work of cutting and undermining their coal, and then by the use of a surprisingly small amount of powder, loosen or bring a large amount of coal; the others, using less brains and more powder, blow their coal into fragments, producing more slack and only bringing down one-half or one-third of the amount. The use of large quantities of powder is always dangerous, to say nothing of its being a large item of expense to the miner; and this method is not mining; it is murdering the coal and should be deprecated by every intelligent miner. A good miner is the master of a science as truly as a good mechanic; he applies principles as truly scientific as any that operate in the mechanical world; let him aim to emulate his work and raise the standard of his labor by studying to do his work in the most approved manner, and then will he reap the fruits of his labor. He will lessen his expenses by using less powder and produce a greater proportion of lump coal.

There is still one other point which we would like to mention before closing, and that is, the differences that exist or are supposed to exist, between the miner and the operator. As a rule, these differences are more imaginary than real, and exist only in the minds of agitators and labor organizers; they are not real. We do not mean to underrate the value of organized labor, where such an organization is guided and controlled by the quiet consideration and the better judgment of the industrious class of the miners—in such a case we do not fear any serious or prolonged difficulty between these two prime factors—labor and capital.

Let the laborer be independent, self-reliant in his thought, and careful in his conclusions; let him work to forward his employer's interests in all respects, and then demand the same treatment in return. An agitator—a "walker"—employed to look after the interests of the miner, when times are quiet and things are running smoothly with their client, must do something or find something somewhere, or he feels he will lose his position, forgetting that the reign of peace is the silent but happy witness of prosperity.

and the proof of how well he is looking after the interests of his fellow miners; on the other hand, a continual disagreement between employers and employed ought to be, in and of itself, convincing proof to the miner that this method has not been and is not a success, and should be abandoned. Every honest miner, as he values prosperity, should do his own thinking, and only rise to the call of a mass meeting when the emergency of the times demand such a demonstration, and then let him sound no uncertain note. Again, we say, look after your own interests.

One word more and we are done: The relations between a boss and his men should be kindly, always. A man will not respond more quickly when he hears an oath, nor will his work be better done because of rough treatment. A boss must gain the confidence of his men or lose control of them practically. The hardest case is when men have more reason and more brains than the boss; this is a case for the superintendent or some one higher in authority. It is an error of judgment on the part of the company to place such a man in charge of its affairs. It will result in no permanent good to the company or to the men. In such a case a man, if he cannot get on, had better look elsewhere for work; protesting will do no good.

STRIKES—AND SUGGESTIONS FOR THEIR REMEDY.

The frequency of strikes and the disastrous consequences usually resulting, not only to labor and capital, but also to the public generally, demand serious attention, to the end that some remedy may be provided.

Investigations which have thus far been made into the causes of these disturbances have disclosed that by far the larger number of strikes have their immediate origin in the distance, that, as a rule, exists between the parties most directly and vitally interested. The employers of labor, in nearly, if not quite all, those industrial pursuits requiring the use of large amounts of capital, are not in that close contact with the employed necessary to enable them to understand and appreciate the latter's wants. Employers of labor in industrial enterprises of this character are generally represented by middle men, such as superintendents, overseers, bosses, and the like, whose interest is to make the best profitable showing possible. In other words, to show the largest production at the least cost. To the extent that they are able to do this determines their value as managers. Thus they stand between the capital invested and the labor employed as the representatives of the former, and the result is the grievances of labor rarely reaches the ears of capital until the situation becomes so grave that a strike is declared, which in its origin is not so much against capital itself as it is to protest against the methods used towards labor by the representatives of capital. In all the preliminary steps leading up to the final stoppage of work, labor is left to itself to brood over its real or fancied wrongs, whereas, if the proprietors themselves properly understood the situation and could step in, the final trouble could, in most cases, be avoided.

Probably nine-tenths of all the strikes which occur are due to the fact that at the beginning no effort is made by capital in the direction of conciliation, mainly through ignorance on its part of existing dissatisfaction until the point of open rebellion is reached, when more or less, and generally more, unreasonableness on the part of labor obtains.

This being the case it is most important that capital and labor should be in closer touch, and this is the first necessary step in remedying the strike evil. This could and doubtless should be supplemented by boards of conciliation authorized by the State and empowered to act as a board of arbitration within clearly defined limits, whenever the necessity for such action justified it. Such conditions, while they would not remove the strike evil, would go far toward reducing the number of such industrial disturbances and would be a saving to both capital and labor of a large amount annually. Such a course would be a stimulus to fairness on both sides and create a willingness to be just, and the result would be that capital would feel a new sense of safety and labor would realize a new security, neither would rashly disturb.

It should be borne in mind, however, that the solution of the labor problem involves now more than has been outlined above, which at best are only suggestions for the partial remedying of present evils, or the creation of mitigating conditions which in no wise reach the cause of industrial disturbances. Labor difficulties, as they exist to-day, have their origin in the forceful agencies which are impelling forward the civilization of the age, and are the outgrowth of the inevitable tendency of events towards equality of conditions. As a people we have solved the problem of liberty for all, and now there is no disguising the fact that we are in the throes of an effort to determine the proper measures of justice to all in the complex economic conditions which the realizations of liberty and the natural resources of land and sea have given us.

As our laws naturally grew out of those relations which had their birth in the age of feudalism, so have our industrial actions been formed from those ideas that had taken deep root in the very life of that phase of civilization in which economic conditions bear as little resemblance to ours as does a rippling brook to a mighty river.

The tendency of older civilization was in the direction of the centralization of wealth. The idea in which governments first took root was the supposed necessity of one to rule the many, and this once acknowledged naturally strengthened itself with those in power until the claim of the "divine right" of kings to rule was boldly made and successfully sustained. With us, however, this is far in the past. The American citizen holds for himself the right of sovereignty, and maintains that the "divine right" to rule is his and his alone. The starting of this mighty revolution was in the agencies which overthrew the feudal system. When this was accomplished the individual came up, in a political sense, and influence of power passed from the few to the many. The change thus made did not touch immediately all the relations of life alike. It prominently affected only the political relations of men, but it has been constantly and irresistibly extending itself to all conditions in the body politic. At first the individual, in the enjoyment of political liberty, lost sight of a new growth of feudalism along the line of corporate power and financial control. The people, resting secure upon their political liberties, gave no special heed to such developments in their economic relations and they were generous in granting privileges to corporations and indifferent, because thoughtless, to that legislation which concentrates wealth, permits such a use of the same as results in injustice to the many and disturbing the peace of society. Hence comes the unrest of the present and with it the many industrial disturbances, which are the incidents naturally growing out of a purpose to discover some means whereby the productions of labor can be more equitably distributed without doing an injustice to capital.

With the growth of organized capital, organized labor came into being as a necessity to preserve an equilibrium in economic relations, pending the solution of those problems arising out of that irresistible tendency of our civilization to realize a greater equality in conditions and a larger measure of justice to labor interests.

In the past as well as in the present, labor has always been regarded as a commodity to be bought and sold the same as an article of commerce and subject to the same laws of supply and demand. Out of this has grown all the evils which have and do affect the body politic in an industrial sense. This however, would not follow but for the

creation of corporate power by legislative enactments. With the establishment of corporations with large amount of capital, there came a change in the relations of accumulated wealth to the people, but no change in the old recognized relations of labor to capital or capital to labor. The idea that labor should only be recognized as a commodity still prevails, and if any concessions are made by capital by which this conception of labor appears modified, it is regarded as conceding temporarily a right that belongs exclusively to capital and not to any right inherent in labor. Hence it is that labor has never been admitted upon an equal footing with organized capital, but has been compelled to occupy an inferior position in the relationship. So long as this remains true, there will never be found a satisfactory solution to the labor problem, and industrial disturbances will continue to exist to a greater or less extent.

The idea of labor as a commodity must give way to that of labor as a partner of and a profit sharer with capital. Its equality must be recognized and established, and until this is accomplished no matter what expedients are tried or legislation enacted along other lines there will continue to be strikes and rumors of strikes.

SUMMARY.

In order that a complete review of the mining industry may be had, we have summarized the reports of the three Districts in the following tables:

TABLE No. 1.

Showing number of mines, number of tons of coal produced, number of miners and other employes, total amount of money paid miners and all other employes, value of product at mines, etc., for the year ending June 30, 1892.

NUMBER OF DISTRICT.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	All other employes	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mine.
District No. 1	118	1,380,800	2,420	830	$ .93	$ 1,007,703	$ 367,705	$ 1.72	$ 1,874,392
District No. 2	73	1,639,735	2,684	801	.78	1,285,842	271,300	1.55	2,421,856
District No. 3	107	970,884	1,862	680	.90	878,613	269,945	1.60	1,552,406
Total	298	4,047,479	6,966	2,311	.87	$ 3,221,858	$ 908,180	$ 1.62	$ 5,848,654

TABLE No. 2.

Showing the number of mines, output of coal, number of miners and employes, amount paid miners and employes, value of output at the mines etc., for the year ending June 30, 1893.

NUMBER OF DISTRICT.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	All other employes	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price per ton at mine.	Total value of product at mine.
District No. 1	107	1,697,715	3,044	1,130	$ .99	$ 1,333,601	$ 573,334	$ 1.82	$ 2,432,931
District No. 2	69	1,784,806	2,666	907	.84	1,357,505	349,480	1.61	2,684,204
District No. 3	111	1,132,857	1,926	683	.93	1,052,850	299,908	1.70	1,925,519
Total	337	4,614,872	7,766	2,720	.92	$ 3,744,048	$ 1,223,322	$ 1.71	$ 7,042,654

TABLE No. 3.

Showing the grand total for the State for the biennial period ending June 30, 1893.

DISTRICTS.	Average number of mines in operation.	Number of tons of coal produced.	Average number of miners employed.	Average number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Average selling price at mine.	Total value of product at mine.
District No. 1	127	3,078,075	2,832	981	$ 1.00	$ 2,401,309	$ 941,039	$ 1.81	$ 4,307,425
District No. 2	71	3,480,930	2,645	854	.81	2,642,847	620,840	1.58	5,106,003
District No. 3	106	2,103,741	2,014	684	.92	1,931,464	569,853	1.65	3,477,919
Grand total	314	8,662,354	7,491	2,519	$ .91	$ 6,975,707	$ 2,132,302	$ 1.66	$ 12,891,305

M. C. BENNETT,
Secretary.

IOWA

MINING LAWS,

PASSED BY THE

TWENTIETH, TWENTY-FIRST, TWENTY-SECOND AND TWENTY-THIRD GENERAL ASSEMBLIES.

IOWA MINING LAWS.

CHAPTER 140, LAWS 1886.

PROVIDING FOR MINE INSPECTORS, THEIR APPOINTMENT, DUTIES AND COMPENSATION.

AN ACT to Repeal Sections 1, 2, 3, 4, 5 and 6, of Chapter 21, Acts of the Twentieth General Assembly, and enact substitutes therefor providing for Mine Inspectors, their manner of appointment, compensation and defining their duties and terms of office.

Be it enacted by the General Assembly of the State of Iowa.

SECTION 1. That there shall be appointed by the Governor with the advice and consent of the Senate three Inspectors of Mines, who shall hold their offices for two years, the said Inspectors subject however to be removed by the Governor for neglect of duty or malfeasance in office. Said term of office shall commence on the first day of April of each even numbered year. Said Inspectors shall have a theoretical and practical knowledge of the different systems of working and ventilating coal mines and of the nature and properties of the noxious and poisonous gases of mines and of mining engineering, and said Inspectors before entering upon the discharge of their duties shall take an oath or affirmation to discharge the same faithfully and impartially, which oaths or affirmations shall be endorsed upon their commissions, and their commissions so endorsed shall be forthwith recorded in the office of the Secretary of State, and such Inspectors shall each give bonds in the sum of two thousand (2,000) dollars, with sureties, to the approval of the Governor, conditioned for the faithful discharge of their duties.

The State shall be divided into districts.

The Governor shall divide the State into inspection districts and shall assign the Inspectors to duty in such place or district as he shall deem proper.

SEC. 2. Said Inspectors shall give their whole time and attention to the duties of their offices respectively, and shall examine all the mines in this State as often as their duties will permit, to see that the provisions of this act are obeyed, and it shall be lawful for such Inspectors to enter, inspect and examine any mine in this State and the works and machinery belonging thereto, at all reasonable times by night or day, but so as not to unnecessarily obstruct or impede the working of the mines, and to make inquiry and examination into the state and condition of the mine as to ventilation and general security as required by the provisions of this act. The Inpectors shall make a record of all examinations of mines inspected by them showing the date when made, the condition in which the mines are found, the extent to which the laws relating to

Inspectors shall make a record of all examinations.

mines and mining are observed or violated, the progress made in improvement and secured by the provisions of this chapter, number of accidents, injuries or deaths in or about the mines, the number of mines visited, the number of persons employed in or about the mines, together with all such facts and information of public interest concerning the condition of mines as they may think useful and proper, or so much thereof as may be of public interest to be included in their biennial report. The owner and agents of all coal mines are hereby required to furnish the means necessary for such inspection, and it shall be the duty of the persons having charge of mines whenever any loss of life shall occur by accident connected with the workings of such mine to give notice forthwith by mail or otherwise to the Inspector of mines of his district and to coroner of the county in which such mine is situated, and the coroner shall hold an inquest on the body of the person or persons whose death has been caused, and inquire carefully into the cause thereof, and shall return a copy of the verdict and all testimony to the said Inspector. No person having a personal interest in or employed in the mine where a fatal accident occurs shall be qualified to serve on the jury empaneled on the inquest, and the owner or agent of all coal mines shall report to the Inspector all accidents to miners in and around the mines, giving cause of same, such report to be made in writing and within ten days from the time any accident occurs.

In case of accident to give notice to inspector and to coroner of county.

SEC. 3. Said Inspectors while in office shall not act as agents or managers or mining engineers or be interested in operating any mine, and the Inspector shall biennially on or before the 15th day of August preceding the regular session of the General Assembly make a report to the Governor of their proceedings and the condition and operation of the mines in this State, enumerating all accidents in or about the same, and giving all such information as they may think useful and proper, and making such suggestions as they may deem important as to future legislation on the subject of mining.

Inspector to make report to Governor.

SEC. 4. The inspectors provided for in this act shall each receive a salary of twelve hundred dollars ($1,200) per annum, payable monthly, and shall be furnished with necessary stationery and actual traveling expenses, not to exceed five hundred dollars ($500) per annum, *provided* that each Inspector shall file at the end of each quarter of his official year with the Auditor of State a sworn statement of his actual traveling expenses incurred in the performance of his official duty for such quarter, the said salary and expenses to be paid by the State as the salaries and expenses of other State officers are provided for. They shall have and keep an office in the Capitol at Des Moines, in which shall be kept all records, correspondence, papers, apparatus and property pertaining to their duties belonging to the State, and which shall be handed over to their successors in office. And each Inspector shall, during his term of office have and keep a residence in the district to which he is assigned without expense to the State, also have and keep an office at a place designated by the Governor, accessible to railroad and telegraph in their respective districts where at reasonable times and when not actually engaged elsewhere such Inspectors shall be found.

Each Inspector to have a residence and office in his district.

SEC. 5. Any vacancy occurring in the office of Inspector when the Senate is not in session, either by death or resignation, removal by the Governor or otherwise, shall be filled by appointment by the Governor, which appointment shall hold good until his successor is appointed and qualified.

Vacancies to be filled by the Governor.

SEC. 6. There shall be provided for such Inspectors all instruments necessary for the discharge of their duties under this act, which shall be paid for by the State on the certificate of the Inspectors and shall be the property of the State.

CHAPTER 21, LAWS 1884.

MINES AND MINING.

AN ACT to regulate mines and mining, and to repeal Chapter 202 of the Acts of the Eighteenth General assembly.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 7. The agent or owner of every coal mine shall make or cause to be made an accurate map or plan of the working of such mine on a scale of not less than one hundred feet to the inch, showing the area mined or excavated. Said map or plan shall be kept at the office of such mine. The agent or owner shall, on or before the first day of September of each year, cause to be made a statement and plan of the progress of the workings of such mine up to said date, which statement and plan shall be marked on the map or plan herein required to be made, in case of refusal on the part of said owner or agent for two months after the time designated to make the map or plan, or addition thereto, the Inspector is authorized to cause an accurate map or plan of the whole said mine to be made at the expense of the owner thereof, the cost of which shall be recoverable against the owner in the name of the person or persons making said map or plan, and the owner or agent of all coal mines hereafter wrought out and abandoned, shall deliver a correct map of said mine to the Inspector to be filed in his office.

Owner or agent of mines shall make a map or plan of same.

SEC. 8. It shall be unlawful for the owner or agent of any coal mine worked by a shaft to employ or permit any person to work therein unless there are to every seam of coal worked in such mine, at least two separate outlets; separated by natural strata of not less than one hundred feet in breadth, by which shafts or outlets distinct means of ingress and egress are always available to the persons employed in the mine, but in no case shall a furnace shaft be used as an escape shaft; and if the mine is a slope or drift opening, the escape shall be separated from the other openings by not less than fifty feet of natural strata, and shall be provided with safe and available traveling ways, and the traveling ways to the escapes in all coal mines shall be kept free from water, and falls of roof, and all escape shafts shall be fitted with safe and convenient stairs at an angle of not more than sixty degrees descent, and with landings at easy and convenient distances, so as to furnish easy escape from such mine; and all air shafts used as escapes where fans are employed for ventilation shall be provided with suitable appliances for hoisting the underground workmen, said appliances to be always kept at the mine ready for immediate use, and in no case shall any combustible material be allowed between any escape shaft and hoisting shaft, except such as is absolutely necessary for the operation of the mine, provided that where a furnace shaft is large enough to admit of being divided into an escape shaft and a furnace shaft. There may be a partition placed in said shaft properly constructed so as to exclude the heated air and smoke from

There shall be two separate outlets to every seam of coal worked.

the side of the shaft used as an escape shaft, such partition to be built of incombustible material for a distance of not less than fifteen feet up from the bottom thereof, and provided that where two or more mines are connected underground. Each owner may make joint provisions with the other for the use of the other's hoisting shaft or slope as an escape, and in that event the owners thereof shall be deemed to have complied with the requirements of this section, and, provided further, that in any case where the escape shaft is now situated less than one hundred feet from the hoisting shaft there may be provided a properly constructed underground traveling way from the top of the escape shaft, so as to furnish the proper protection from fire for a distance of one hundred feet from the hoisting shaft, and in that event the owner or agent of any such mine shall be deemed to have complied with the requirements of this section; and, provided further, that this act shall not apply to mines operated by slopes or dritts, openings where not more than five persons are employed therein [and provided further, that any escapement shaft that is hereafter sunk and equipped before said escapement shaft shall be located or the excavation of for it begun, the District Inspector of mines shall be duly notified to appear and determine what shall be a suitable distance for the same. The distance from main shaft shall not be less than three hundred feet without the consent of the Inspector, and no building shall be put nearer the escape shaft than one hundred feet, except the house necessary to cover the fan.]—*Chapter 56, Laws of 1888, Section 1.*

SEC. 9. In all mines there shall be allowed one year to make outlets as provided in section eight, when such mine is under two hundred feet in depth, and two years when such mine is over two hundred feet in depth, but not more than twenty men shall be employed in such mine at any one time, until the provisions of section eight are complied with, and after the expiration of the period above mentioned. Should said mines not have outlets aforesaid, they shall not be operated until made to conform to the provisions of section eight [and, provided further, that this act shall not apply to mines where the escape way is lost or destroyed by reason of the drawing of pillars preparatory to the abandonment of the mine, provided that not more than twenty persons shall be employed in said mine at any one time.]

SEC. 10. The owner or agent of any coal mine, whether it be operated by shaft, slope or drift, shall provide and maintain for every such mine an amount of ventilation of not less than one hundred cubic feet of air per minute for each person employed in such mine, and not less than five hundred cubic feet of air per minute for each mule or horse employed in the same, which shall be distributed and circulated throughout the mine in such manner as to dilute, render harmless and expel the poisonous and noxious gases from each and every working place in the mine, and whenever the Inspector shall find men working without sufficient air or under any unsafe conditions he shall first give the operator or his agent a reasonable notice to rectify the same and upon a refusal or neglect so to do the Inspector may himself order them out until said portion of said mine shall be put in proper condition, and all mines governed by the provisions of this act shall be provided with artificial means for producing ventilation such as exhaust or forcing fans, furnaces or exhaust steam or other contrivances of such capacity and power as to produce and maintain an abundant supply of air for all the requirements of the persons employed in the mine; but in case a furnace is used for ventilating purposes it shall be built in such manner as to prevent the communication of fire to any part of the works by lining the upcast with incombustible material for a sufficiennt distance up from said furnace to insure safety.

SEC. 11 The owner or agent of every coal mine operated by a shaft or slope in all cases where the human voice cannot be distinctly heard shall forthwith provide and maintain a metal tube or other suitable means for communication from the top to the bottom of said shaft or slope, suitably calculated for the free passage of sound therein, so that communication can be held between persons at the bottom and top of the shaft or slope, and there shall be provided a safety catch of approved pattern and a sufficient cover overhead on all carriages used for lowering and hoisting persons, and on top of every shaft an approved safety gate and also an approved safety spring on top of every slope, and an adequate brake shall be attached to every drum or machine used for raising or lowering persons in all shafts or slopes, and a trial shall be attached to every train used on a slope, all of said appliances to be subject to the approval of the inspector.

A metal tube shall be put in shaft for communication from top to bottom.

SEC. 12. No owner or agent of any coal mine operated by shaft or slope shall knowingly place in charge of any engine used for lowering into or hoisting out of such mine persons employed therein, any but experienced, competent and sober engineers, and no engineer in charge of such engine shall allow any person except such as may be deputed for that purpose by the owner or agent, to interfere with it or any part of the machinery, and no person shall interfere or in any way intimidate the engineer in the discharge of his duties, and the maximum number of persons to ascend out of or descend into any coal mine on one cage, shall be determined by the Inspector, but in no case shall such number exceed ten, and no person shall ride upon or against any loaded cage or car in any shaft or slope except the conductor in charge of the train.

Engineers must be experienced, competent and sober.

Number of persons on cages to be determined by Inspector.

SEC. 13. No boy under twelve years of age shall be permitted to work in any mine, and parents or guardians of boys shall be required to furnish an affidavit as to the ages of their boys when there is any doubt in regard to their age, and in all cases of miners applying for work the agent or owner of the mines shall see that the provisions of this section are not violated.

No boy under twelve years of age permitted to work in coal mines.

SEC. 14. In case any coal mine does not in its appliances for the safety of the persons working therein conform to the provisions of this act, or the owner or agent disregards the requirements of this act for twenty days after being notified by the Inspector, any court of competent jurisdiction, while in session, or the judges in vacation, may, on application of the Inspector, by civil action in the name of the State, enjoin or restrain by writ of injunction the said agent or owner from working or operating such mines with more persons at once than are necessary to make the improvements needed, except as provided in section eight and nine, until it is made to conform with the provisions of this act, and such remedies shall be cumulative, and shall not take the place of or effect any other proceedings against such owner or agent authorized by law, for the matter complained of in such action, and for any willful failure or neglect to comply with the provisions of this law by any owner, lessee or operator of any coal mine or opening whereby any one is injured, a right of action shall accrue to the party so injured for any damage he may have sustained thereby, and in case of loss of life by reason of such willful neglect or failure aforesaid, a right of action shall accrue to the widow, if living, and if not living, to the children of the person whose life shall be lost, for like recovery of damages for the injury they shall have sustained.

Owner or agent liable for damages in case of negligence.

SEC. 15. Any miner workman or other person who shall knowingly injure or interfere with any air-course or brattice, or obstruct or throw open doors or disturb any part of the machinery, or disobey any order given in carrying out the provisions of this act, or ride upon a loaded car or wagon in a shaft or slope, except as provided in section twelve, or do any act whereby the lives and health of the persons or the security of the mines and machinery is endangered, or if any miner or person employed in any mine governed by the provisions of this act shall neglect or refuse to securely prop or support the roof and entries under his control, or neglect or refuse to obey any order given by the superintendent in relation to the security of the mine, in the part of the mine under his charge or control, every such person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding one hundred dollars or imprisonment in the county jail not exceeding thirty days.

Misdemeanor for miners to neglect to prop the roof of rooms in their charge.

SEC. 16. Whenever written charges of gross neglect of duty or malfeasance in office against any Inspector shall be made and filed with the Governor, signed by not less than fifteen miners or one or more operators of mines, together with a bond in the sum of five hundred dollars payable to the State and signed by two or more responsible freeholders and conditioned for the payment of all cost and expenses arising from the investigation of such charges, it shall be the duty of the Governor to convene a board of examiners to consist of two practical miners, one mining engineer and two operators, at such time and place as he may deem best, giving ten days' notice to the Inspector against whom charges may be made, and also the person whose name appears first in the charges, and said board when so convened and having first been duly sworn or affirmed truly to try and decide the charges made, shall summon any witness desired by either party and examine them on oath or affirmation which may be administered by any member of the board and depositions may be read on such examination, as in other cases, and report the result of their investigations to the Governor; and if their report shows that said Inspector has grossly neglected his duties or is incompetent or has been guilty of malfeasance in office, it shall be the duty of the Governor forthwith to remove said Inspector and appoint a successor; and said board shall award the cost and expenses of such investigation against the Inspector or person signing said bond.

Inspector may be removed for malfeasance in office or incompetency.

SEC. 18. The owner, agent or operator of any coal mine shall keep a sufficient supply of timber, to be used as props, so that the workman may at all times be able to secure the workings from caving in, and it shall be the duty of the owner, agent or operator to send down all such props when so required.

Owners or agents shall furnish timber for props whenever required.

SEC. 19. Any person willfully neglecting or refusing to comply with the provisions of this act when notified by the Mine Inspector to comply with such provisions, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding five hundred dollars or imprisonment in the county jail not exceeding six months, except when different penalties are herein provided.

Failure to comply with this section a misdemeanor.

SEC. 20. Chapter 202 of the acts of the Eighteenth General Assembly is hereby repealed.

SEC. 2. That chapter 21, laws of the Twentieth General Assembly be and the same is hereby amended by enacting the following supplementary section:

Section 22. The Executive Council shall appoint a board of examiners, composed of two practical miners, two mine operators and one mining engineer who shall have at least five years' experience in his profession. The members of said board shall be of good moral character, and citizens of the United States and State of Iowa, and they shall before entering upon their duties take the following oath (or affirmation): I ——, do solemnly swear (or affirm) that "I will perform the duties of examiner of candidates for the office of Mine Inspector to the best of my ability, and that in recommending any candidate I will be governed by the evidence of qualification to fill the position under the law creating the same, and not by any consideration of political or personal favors; that I will grant certificates to candidates according to their qualifications and the requirements of the law." They shall hold their office for two years.

The Executive Council shall appoint a board of examiners.

Section 23. Said board shall meet biennially on the first Monday in April of each even-numbered year, except that for the year 1888, said board shall meet on the second Monday, in the office of State Mine Inspector, in the Capitol, and they shall publish in at least one newspaper published in each mining district of the State the date fixed by them for the examination of candidates. They shall be furnished with the necessary stationery and other necessary material for said examination in the same manner as other State officers are now provided. They shall receive as compensation the sum of $5.00 per day for time actually employed in the duties of their office and actual traveling expenses. The said compensation and expenses shall be paid in the same manner as the salaries and expenses of other State officers are now paid; *provided*, that in no case shall the per diem received by any member exceed $50.00 for each biennial session.

Section 24. Certificates of competency shall be granted only to citizens of the United States and State of Iowa, of good moral character, not less than twenty-five years of age, who shall have had at least five years' experience in the mines, and who shall not have been acting as agent or superintendent of any mine for at least six months prior to their appearance for examination.

Section 25. The examination of candidates for the office of Mine Inspector shall consist of oral and written questions in theoretical and practical mining and mine engineering, on the nature and properties of noxious and poisonous gases found in mines, and on the different systems of working and ventilating of coal mines. The candidates shall not be allowed to have in their possession at the time of their examination, any books, memoranda or notes to be used as aids in said examination. The board of examiners shall give to all persons examined who in their judgment possess the requisite qualifications, certificates of such qualification, and from the persons holding such certificates the Governor shall appoint the State Mine Inspector.

Section 26. This act being deemed of immediate importance shall take effect on and after its publication in the Iowa State Register and Des Moines Leader, newspapers published in Des Moines, Iowa.

Approved April 12, 1888.

CHAPTER 53, LAWS OF 1888.

PROVIDING FOR THE WEIGHING OF COAL AT MINES.

AN ACT to Amend Chapter 21 of the Acts of the 20th General Assembly, Providing for the weighing of Coal at Mines.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That the owner or agent of each coal mine within this State, at which the miners are paid by weight, shall provide at such mines suitable scales of standard make for the weighing of all coal mined.

SEC. 2. The owner or agent of such mine shall require the person authorized to weigh the coal delivered from said mine to be sworn before some person having authority to administer an oath, to keep the scales correctly balanced, to accurately weigh, and to record a correct account of the amount weighed of each miner's car of coal delivered from such mine, and such oath shall be kept conspicuously posted at the place of weighing. The record of the coal mined by each miner shall be kept separate and shall be open to his inspection at all reasonable hours, and also for the inspection of all other persons pecuniarily interested in such mine.

SEC. 3. In all coal mines in this State the miners employed and working therein may furnish a competent check-weighman, who shall at all proper times have full right of access and examination of such scales, machinery or apparatus, and seeing all measures and weights of coal mined and accounts kept of the same, provided that not more than one person on behalf of the miners collectively shall have such right of access, examination and inspection of scales, measures and accounts at the same time, and that such person shall make no unnecessary interference with the use of such scales, machinery or apparatus. The agent of the miners, as aforesaid, shall before entering on his duties, make and subscribe to an oath before some officer duly authorized to administer oaths, that he is duly qualified and will faithfully discharge the duties of check-weighman. Such oath shall be kept conspicuously posted at the place of weighing.

SEC. 4. Any person, company or firm having or using any scale or scales for the purpose of weighing the output of coal at mines so arranged or constructed that fraudulent weighing may be done thereby, or who shall knowingly resort to or employ any means whatsoever by reason of which such coal is not correctly weighed, or reported in accordance with the provisions of this act; or any weighman or check-weighman who shall fraudulently weigh or record the weights of such coal, or connive at or consent to such fraudulent weighing, shall be deemed guilty of a misdemeanor, and shall, upon conviction for each such offense be punished by a fine of not less than two hundred dollars ($200) or more than five hundred dollars ($500), or by imprisonment in the county jail for a period not to exceed sixty days or by both such fine and imprisonment; proceedings to be instituted in any court of competent jurisdiction.

SEC. 5. Any person, owner or agent, operating a coal mine in this State who shall fail to comply with the provisions of this act, or who shall obstruct or hinder the carrying out of its requirements, shall be fined for the first offense not less than fifty dollars ($50) nor more than two hundred dollars ($200; for the second offense not less than two hundred dollars ($200) nor more than five hundred dollars ($500); and for a third offense not less than five hundred dollars ($500); provided that the provisions of this act shall apply only to coal mines whose products are shipped by rail or water.

SEC. 6. That section 17 of chapter 21 of the laws of 1884 is hereby repealed.

Approved April 6, 1888.

CHAPTER 54, LAWS OF 1888.

WEIGHING COAL AT MINES.

AN ACT to Establish a Uniform System of Weighing Coal at the Mines of this State, and to Punish certain Irregularities connected therewith.

Be it enacted by the General Assembly of the State of Iowa.

SECTION 1. That all coal mined in this State under contract for payment by the ton or other quantity shall be weighed before being screened unless otherwise agreed upon in writing, and the full weight thereof shall be credited to the miner of such coal; and eighty pounds of coal as mined shall constitute a bushel, and two thousands pounds of coal as mined shall constitute a ton. Provided that nothing in this act shall be so construed as to compel payment for sulphur, rock, slate, black jack or other impurities including slack and dirt which may be loaded with or amongst such coal.

SEC. 2. Each State Mine Inspector shall procure from the State Superintendent of Weights and Measures at the expense of the State a full and complete set of standards, balances and other means of adjustment such as are necessary in the comparison and adjustment of the scales, beams and other apparatus used in weighing coal at the mines to the State standards of weight; and it shall be the duty of said Inspectors to examine, test and adjust as often as occasion demands all scales, beams, and other apparatus used in weighing coal at the mines.

SEC. 3. Any person damaged by reason of coal mined not having been weighed and credited to him in accordance with the provisions of this act may recover his damage in a civil action against the employer, but such action must be begun within two years after the right thereto accrued; but his right to recover in such action shall not be barred by reason of his having knowledge of the violation of this act at the time.

Approved April 12, 1888.

CHAPTER 55, LAWS OF 1888.

PROTECT WORKMEN IN MANAGEMENT AND CONTROL OF WAGES.

AN ACT to Provide for the Payment of Wages of Workmen Employed in Mines, in the State of Iowa, in Lawful Money of the United States, and to Protect said Workmen in the Management and Control of their own Earnings.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. It shall be unlawful for any person, firm, company or corporation, owning or operating coal mines in the State of Iowa, to sell, give, deliver or in any manner issue, directly or indirectly, to any person employed by him or it, in payment for wages due for labor, or as advances on wages of labor not due, any script, check, draft, order or evidence of indebtedness, payable or redeemable otherwise than in their face value in money; and such person, firm, company or corporation who shall violate any of the provisions of this section, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not exceeding three hundred dollars ($300) nor less than twenty-five dollars, and the amount of any script, token, check, draft, order or other evidence of indebtedness sold, given, delivered or in any manner issued in violation of the provisions of this act, shall recover in money at the suit of any holder thereof, against the person, firm, company or corporation, selling, giving, delivering, or in any manner issuing the same; provided that this act shall not apply to any person, firm, company or corporation employing less than ten (10) persons.

SEC. 2. Whoever compels, or in any manner seeks to compel or coerce an employe of any person, firm, company or corporation, to purchase goods or supplies from any particular person, firm, company or corporation, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine not exceeding five hundred (500) dollars or imprisoned in the county jail, not exceeding sixty days, or both at the discretion of the court.

SEC. 3. The county attorney of any organized county, upon complaint being made to him of the violation of any of the provisions of this act within this county, shall cause such complaint to be investigated before the grand jury of the county where such wrong has been complained of, at its next session following the time such complaint is made.

Approved April 6, 1888.

CHAPTER 57, LAWS OF 1888.

TO PREVENT BLACK LISTING.

AN ACT for the Protection of Discharged Employes and to Prevent Black Listing.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That if any person, agent, company or corporation, after having discharged any employe from his or its service shall prevent or attempt to prevent by word or writing of any kind such discharged employe from obtaining employment with any other person, company or corporation, except by furnishing in writing on request a truthful statement as to the cause of his discharge, such person, agent or corporation, shall be guilty of a misdemeanor and shall be punished by a fine not exceeding five hundred dollars nor less than one hundred dollars, and such person, agent, company or corporation shall be liable in penal damages to such discharged person to be recovered by civil action; but this action shall not be construed as prohibiting any person or agent of any company or corporation setting forth a truthful statement of the reasons for such discharge.

SEC. 2. If any railway company, any other company or partnership or corporation in this State shall authorize or allow any of its or their agents to black list any discharged employe or attempt by word or writing or any other means whatever to prevent such discharged employe or any employe who may have voluntarily left said company's service from obtaining employment with any other person or company except as provided for in section 1 hereof, such company or co-partnership shall be liable in treble damages to such employe so prevented from obtaining employment, to be recovered by him by civil action.

SEC. 3. This act being deemed of immediate importance shall be in force and take effect from and after its publication in the Iowa State Register and the Des Moines Leader, newspapers published in the city of Des Moines and the State of Iowa.

Approved April 16, 1888.

CHAPTER 46, LAWS OF 1890.

ESCAPE SHAFTS IN COAL MINES.

AN ACT to amend section 9, Chapter 21, Acts of the 20th General Assembly, as amended by Section 2, Chapter 56, Acts of the Twenty-second General Assembly, relative to escape shafts in coal mines.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That Section 9, Chapter 21, of the Acts of the Twentieth General Assembly, as amended by Section 2, Chapter 56, Acts of the Twenty-second General Assembly, be so amended as to read as follows:

Chap. 21, acts 20 G. A., Chap. 56, acts 22 G. A. amended.

Section 9. In all mines there shall be allowed one year to make outlets as provided in Section 8, when such mine is over two hundred feet in depth; and two years when such mine is over two hundred feet in depth; but not more than twenty men shall be employed in such mine at any one time until the provisions of section eight are complied with; [provided that in the case of mines over two hundred feet in depth, there shall be allowed three years on the condition that during the third year not more than ten men shall be employed in such mine at any one time and provided further, that in cases where the two years shall already have expired, a third year shall be allowed after the taking effect of this Act;] and after the expiration of the period above mentioned should said mines not have the outlets aforesaid, they shall not be operated until made to conform to the provisions of section eight. And provided further, that this act shall not apply to mines where the escape way is lost or destroyed by reason of the drawing of pillars preparatory to the abandonment of the mine; provided that not more than twenty persons shall be employed in said mine at any one time.

Time allowed to make outlets.

Number of men employed.

Abandoned mines.

SEC. 2. And provided further, that ten men or less may be lawfully employed in any coal mine without reference to the provisions of this or any other act.

Ten men may be employed at all times.

Approved April 17, 1890.

CHAPTER 47, LAWS OF 1890.

PROTECTION OF LABORERS.

AN ACT to protect laborers and miners for labor performed in developing and working in Coal mines, additional to Chapter 100 Acts of the 16th General Assembly and Chapter 179, Acts of the 20th General Assembly.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. Every laborer or miner who shall perform labor in opening and developing any coal mine, including sinking shafts, constructing slopes, or drifts, mining coal and the like, shall have a lien upon all the property of the person, firm or corporation, owning, constructing or operating such mine, used in the construction or operation thereof, including real estate, buildings, engines, cars, mules, scales and all other personal property, for the value of such labor for the full amount thereof, upon the same terms with the same rights and to be secured and enforced as mechanics' liens are secured and enforced.

Labor performed in opening and developing mines a lien upon the property.

SEC. 2. This act being deemed of immediate importance shall take effect and be in force from and after its publication in the Iowa State Register and Des Moines Leader newspapers published in Des Moines, Iowa.

Publication.

Approved April 30, 1890.

FIFTH BIENNIAL REPORT

OF THE

Bureau of Labor Statistics

FOR THE

STATE OF IOWA.

1892—93.

J. R. SOVEREIGN, COMMISSIONER.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY

DES MOINES:
G. H. RAGSDALE, STATE PRINTER.
1893.